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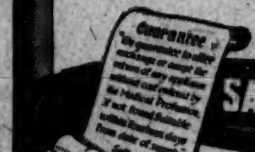

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BRITISH MEDICAL JOURNAL

LONDON SATURDAY OCTOBER 25 1947

AETIOLOGY OF STEATORRHOEA*

BY

A. C. FRAZER, M.D., D.Sc., M.R.C.P.

Professor of Pharmacology, University of Birmingham

Steatorrhoea is commonly observed in cases of tropical and non-tropical sprue, coeliac disease, pancreatitis, gastro-colic fistula, and a number of other conditions. The percentage of fat in the faeces is, however, a misleading index, except in gross cases, and the diarrhoea is due to factors not entirely related to the underlying primary defect. In studying the aetiology of steatorrhoea it is therefore better to study the whole group of cases with defective fat absorption rather than to confine the investigation to severe cases of fatty diarrhoea. A balance test, based on the measured intake and output of fat, is the criterion by which the normality or otherwise of fat absorption is judged. A normal human subject on a diet containing 50 g. of fat absorbs 95% or more of the fat ingested. Fat absorption may be regarded as defective in all cases absorbing 90% or less. Repeated tests are advisable in the doubtful zone of 90 to 95%. These figures are based on an assumption that the excretion of fat is not greatly altered in the cases under investigation. The rapid response to changes in dietary fat and the immediate reduction of faecal fat to normal levels on ingestion of a low-fat diet support the view that changes in fat excretion are not a major factor in the cases so far investigated (Cooke *et al.*, 1946).

Fat absorption may be divided into three phases: an intraluminar phase, during which the fat is prepared for absorption; an intracellular phase, in which the fatty material passes through the intestinal cell; and a distributive phase, when the fat is dispersed from the intestine by various pathways into the body. In each of these phases the normal mechanism of absorption, the methods of study in the human subject, the observations made in cases of defective absorption, and the possible significance of these observations in the aetiology of steatorrhoea will be discussed.

Intraluminar Phase of Fat Absorption

Fat is mainly ingested as triglyceride, and there is no doubt that this fat is finely dispersed to an emulsion of particle size of less than 0.5 μ diameter in the lumen of the small intestine. In the normal subject the *p*H in the upper two-thirds of the intestine is acid (about 6.5). Fine dispersion of triglyceride at this *p*H requires a specialized emulsifying system. If the possible factors are tested in various combinations, only one system can be shown to be effective under these conditions *in vitro*. This is the triple combination fatty-acid–bile-salt–monoglyceride (Frazer, Schulman, and Stewart, 1944). The formation of fatty acid and monoglyceride can be shown to occur during the first five hours of pancreatic lipolysis *in vitro* (Frazer and Sammons, 1945). This partial lipolysis provides two of the three essential components of the emulsifying system. If material is removed from the lumen of the intestine in either rats or human subjects during fat absorption the presence of these three essential components in adequate quantities can be demonstrated.

The intraluminar changes have been studied in human subjects by passing a Miller–Abbott tube a measured distance down the small intestine. The intestinal lumen was obstructed by inflation of the bag on the end of the tube and a resting sample of intestinal contents was obtained from the region above the point of obstruction. Oil was now administered by mouth and samples of intestinal contents withdrawn at intervals for the next four hours. The various samples were examined for enzyme activity, and the fatty material was analysed chemically and investigated by protein flocculation (Elkes *et al.*, 1945) and other techniques to determine the nature of the interfacial film covering the oil globules. The degree of dispersion of the fat was determined by microscopical examination under dark-ground illumination. The intestinal contents of normal subjects contained lipase, trypsin, and amylase. The fat was finely dispersed to a particle size of less than 0.5 μ, the particles were negatively charged, and did not contain phospholipid as an essential part of the stabilizing system. Fatty acids, monoglycerides, and bile salts were present. The *p*H of the intestinal contents was 6.5, or more acid. Of the cases of defective fat absorption studied, only two groups showed abnormal intraluminar changes. Cases of biliary obstruction or hepatic cirrhosis, in which bile salts were not

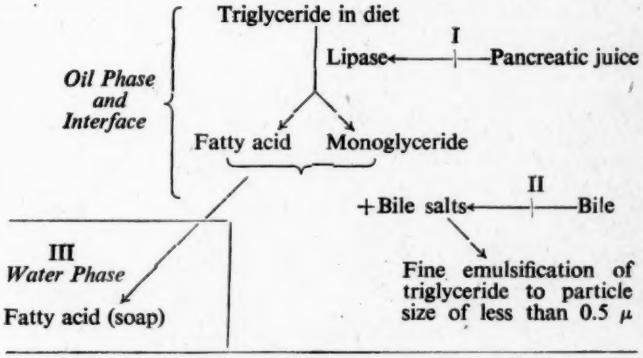

FIG. 1.—Intraluminar phase of fat absorption.

Possible Defects:

I. Defective lipolysis—e.g., atrophic pancreatitis.
II. Defective bile salts—e.g., biliary obstruction.
III. Influenced by environment or nature of triglyceride (see Fig. 3).

*Based on a paper read to the Paediatrics Section of the International Conference of Physicians, London, Sept. 10, 1947.

passed into the lumen, showed poor emulsification of the fat, with large particles of oil which were not finely dispersed by agitation of the samples. After addition of bile salts to this material, emulsification rapidly occurred. In a case of atrophic pancreatitis, subsequently proved at necropsy, emulsification was also grossly deficient, and in this case there was a complete absence of pancreatic enzymes in the upper intestinal contents. The addition of bile salts was not effective in this case, but the addition of lipase caused immediate fine emulsification. The intestinal contents of all other varieties of defective fat absorption so far examined, including tropical and non-tropical sprue and regional ileitis, have shown normal dispersion of fat and apparently normal enzyme activity. The *p*H of the intestinal contents in some of these cases has been somewhat higher than normal, but the validity and significance of this observation is being further investigated. In a small number of cases of tropical sprue, investigated with Squad.-Ldrs. G. A. Smart and R. Daley (1946), we observed a peculiar flocculation of the intestinal contents, the cause of which we were unable to establish. Unfortunately, further cases were not available and we have not seen this phenomenon in any other patients.

It may be concluded from these various observations that long-chain triglycerides are partially hydrolysed in the upper part of the small intestine to fatty acids and lower glycerides, and that these two substances, with bile salts, provide the emulsifying system by which the remaining glycerides are dispersed into fine particles of less than 0.5 μ diameter. These changes would appear to occur normally in tropical and non-tropical sprue and in regional ileitis, but they do not occur in conditions which interfere with any of the essential components of the emulsifying system. Thus exclusion of pancreatic lipase, or of bile salts, resulted in gross interference with the preparatory changes which triglyceride undergoes in the intestinal lumen.

Intracellular Phase of Fat Absorption

The passage of fatty material through the intestinal cell presents three main groups of problems:

(a) Passage of Fatty Material through the Outer Membrane of the Cell

Many water-soluble materials appear to pass through the outer membrane of the intestinal cell, although the precise mechanism of absorption and the factors responsible for the differences in the rate of transmission of water-soluble substances are still obscure. It can be shown that fatty acids will pass into the intestinal cell, possibly in the form of soaps (Schmidt-Nielsen, 1946). It is probable, however, that the hydrolysis of long-chain fats is only partial in the upper part of the small intestine, and consequently a second mechanism must exist for the passage of water-insoluble glycerides through the outer membrane.

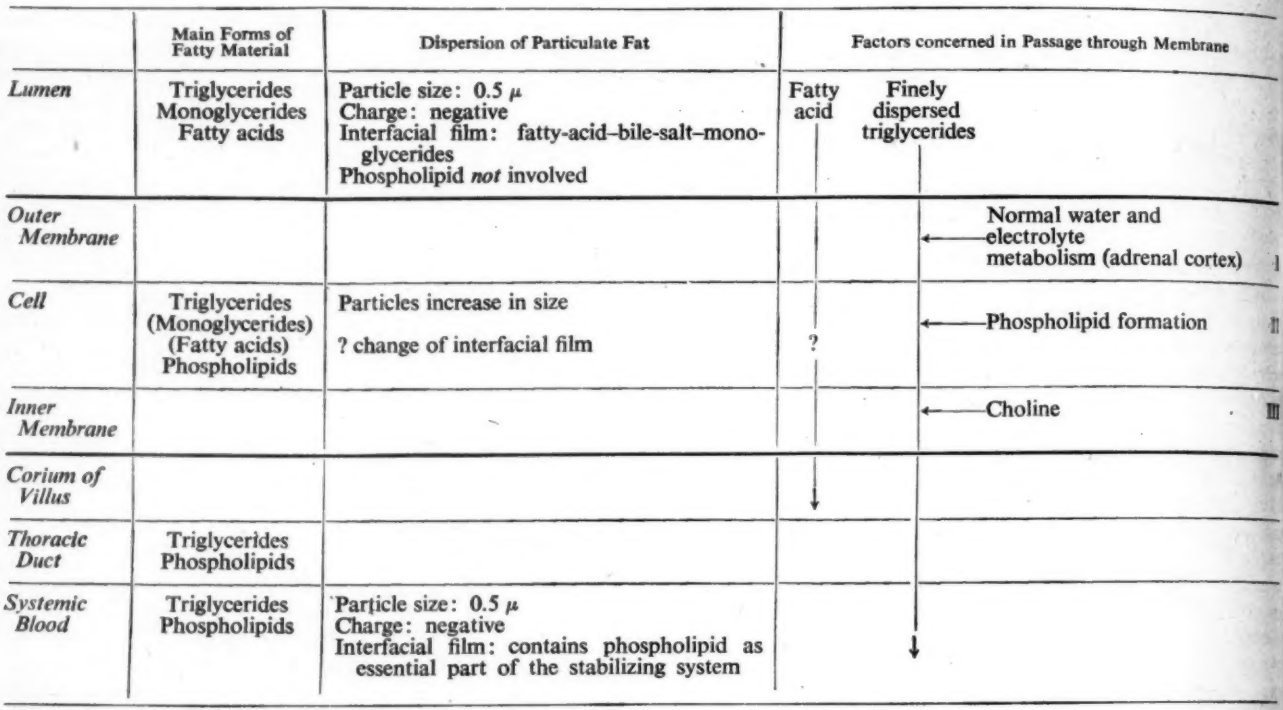

FIG. 2.—Intracellular phase of fat absorption.

Possible Defects:

I. Interference with water and electrolyte metabolism—e.g., adrenalectomy: Addison's disease.
II. Defective phosphorylation
III. Defective transport from the cell
} Possible defects in "sprue syndrome." (NOTE.—Fatty acid absorption will not be prevented by these lesions.)

Long-chain triglycerides are finely dispersed to a particle size of less than 0.5 μ in the intestinal lumen by the emulsifying system already described; the outer membrane of the intestinal cell has been shown by Baker (1942) to consist of fine canals, which might allow the passage of particles approximately 0.3 μ in diameter. Paraffin can be absorbed from the intestine, provided that it is previously dispersed with a suitable emulsifying system to a particle size of less than 0.5 μ (Frazer, Schulman, and Stewart, 1944). Thus the evidence at present available supports the conception that long-chain triglycerides may pass through the outer membrane of the cell in fine particulate form.

The first step in the study of this phase of absorption in the human subject is to determine, if possible, whether the defect is concerned with the passage of fatty acid or of particulate fat through the cell. It seems probable that the post-absorptive systemic lipaemia is normally dependent upon particulate absorption. By the correlation of chylo-

micrographs (Frazer and Stewart, 1939) or serial blood fat estimations with a fat-balance test it is possible to determine whether particulate absorption is normal. In cases showing normal intraluminar changes, in the absence of lymphatic obstruction, the absorption of 60 to 70% of ingested fat, without any subsequent systemic lipaemia, strongly suggests interference with particulate absorption. Such a phenomenon is observed in tropical and non-tropical sprue and in cases of gastro-colic fistula. In regional ileitis, on the other hand, normal systemic lipaemia may be observed although the total amount of fat absorbed is no greater than in many cases of the sprue group. It is possible that interference with particulate absorption may lead to the absorption of an increased proportion of fatty acid. This possibility is further discussed in the section on the distributive phase.

Adrenalectomy does not affect the absorption of fatty acids or tributyrin but seems to cause partial interference with the absorption of long-chain triglyceride. The loading of the intestinal cell with fat globules, which is characteristic of particulate absorption, is prevented by adrenalectomy. Adrenalectomy does not cause any change in the turnover of phospholipid in the intestinal cell. The absorption of long-chain triglycerides returns towards normal with adequate salt therapy (Bavetta and Deuel, 1942; Frazer, 1947; Stillman *et al.*, 1942). It seems possible, therefore, that the action of the adrenal cortex on fat absorption is mainly due to its effect on water and electrolyte metabolism, which may be intimately associated with the mechanism of particulate absorption.

Severe cases of sprue may show a marked disturbance of water and electrolyte metabolism (Black, 1946). Dehydration is a pronounced feature in the terminal stages, and less severe cases may exhibit low blood sodium levels and hypotension. Severe cases of Addison's disease may show a moderate degree of defective fat absorption. It has been suggested that adrenal cortical deficiency may be an aetiological factor in the sprue syndrome (Verzár and McDougall, 1936). On the other hand, patients with non-tropical sprue can be relieved of any suggestive signs of adrenal insufficiency by appropriate treatment without any change in the quantitative aspect of the fat-absorption defect. It is not impossible that the continued low blood cholesterol which is usual in these cases may result in a secondary insufficiency of adrenal cortical hormone. It seems probable from these observations that adrenal cortical insufficiency is not an aetiological factor in the sprue syndrome, but it is likely that the secondary disturbances of water and electrolyte metabolism, whether due to adrenal cortical insufficiency or to other causes, would further embarrass a defective fat-absorption mechanism.

(b) Alteration in the Composition and Distribution of Fatty Material within the Intestinal Cell

Under special experimental circumstances re-synthesis of triglyceride can be demonstrated *in vivo*, as indeed it can also be demonstrated *in vitro*. There is little evidence, however, to suggest that it is an important feature in normal fat absorption, especially if a high proportion of the fatty material passes into the cell in the unhydrolysed form.

It has been clearly shown that phospholipid is formed in the cell during fat absorption (Schmidt-Nielsen, 1946; Sinclair, 1936). The function of the phospholipid formed in the intestinal cell is not understood, but certain observations may usefully be considered. The particles of fat in the intestinal lumen are negatively charged, flocculate with plasma protein at *p*H 7.4 (Elkes *et al.*, 1945), and are resistant to the action of *Clostridium welchii* D-lecithinase (Elkes and Frazer, 1943). In the intestinal cell, if fat alone is fed, the particles show a loss of stability, which suggests that the effective stabilizing film has been modified and that there is interference with the provision of a new stabilizing film under the conditions of this experiment. Triglycerides and phospholipid, but only small amounts of fatty acids or lower glycerides, can be demonstrated in the chyle during fat absorption. In the blood at the height of fat absorption a mass of finely dispersed particles, composed essentially of triglycerides, can be seen, which obviously do not flocculate in the presence of plasma proteins at *p*H 7.4. Furthermore, these particles rapidly cream when attacked by *Cl. welchii* D-lecithinase. It seems possible, therefore, that one important function of phosphorylation in the intestinal cell is to provide phospholipid for the change in interfacial film structure which must occur if the fat particles are to remain in a dispersed state in the protein environment of the blood stream.

(c) Passage of Fatty Material through the Inner Membrane of the Cell

The passage of fat through the inner membrane of the intestinal cell has received little attention. From the study of intra-vitam fixed preparations of the rat's intestine, the distribution and state of dispersion of absorbed fat in the cell and villus can be investigated. If fat and water alone are fed, the fatty material passes freely through the outer border of the cell. As the dose of fat is increased, fat accumulates within the cells. If a loading dose is administered with 5 mg. of choline hydrochloride, dissolved in the water phase, accumulation of fat in the cells is less marked and a large amount of fat can now be seen in the corium of the villus. It would seem, therefore, that the addition of choline to the fat in some way facilitates its passage through the inner membrane of the cell. A striking feature of these preparations, however, is a further loss of stability of the fat particles, so that large pools of fat are formed in the central part of the villus (Frazer, 1947).

It is often assumed that the phospholipid formed in the intestinal cell during fat absorption is lecithin. It is quite possible that other phosphatides may be involved, especially in the change of the interfacial film of the fat particle. Whether the effect of choline is related to the phosphorylation process in the cell is not known. Until further evidence is available it would be wise to consider the action of choline and the formation of phospholipid in the intestinal cell as two possibly unrelated phenomena.

The existence of a defect in phosphorylation has been cited as a possible aetiological factor in the sprue syndrome (Verzár, 1935; Stannus, 1942). Direct evidence in support of such a conception is lacking, although the gradual elimination of other possibilities suggests that an intracellular defect may be important in many of the cases in this group. It is likely that a number of different aetiological factors, each of which may perhaps result in the same fault in the fat-absorption mechanism, may be concerned in the sprue syndrome. For example, phosphorylation in the intestinal cell might be prevented by an intracellular enzyme defect, or by lack of raw materials for phosphorylation, which in turn might be occasioned by dietary deficiency, by defective digestion elsewhere, or by competitive demands in the intestinal lumen. Until more adequate information is available as to the nature of the phospholipid formed, the factors governing its formation in the intestinal cell, and the function which it fulfils, it is difficult to develop effective methods for the detection and differentiation of these defects in the human subject.

Some years ago Mottram, Cramer, and Drew (1922) reported findings somewhat similar to the choline experiments described above when they administered "marmite"

with fat. They attributed the effect observed to the actions of vitamins A and B. Consequently the effects of vitamins A, C, and D and the various components of vitamin B on the fat-absorption mechanism were investigated along the same lines as the choline investigation. None of these substances, with the exception of choline, had any apparent effect on the distribution of fat in the intestinal cells and villi during absorption.

Deficiencies of riboflavine or nicotinic acid are frequently associated with fat-absorption defects, especially the sprue syndrome. It is possible, however, to give dramatic relief to deficiency signs and symptoms by administration of the appropriate vitamin fraction without any measurable change in the fat-absorption defect. Cases have also been reported of ariboflavinosis and other vitamin deficiencies in which fat absorption was normal. Gross vitamin deficiency, which is not a feature of the sprue syndrome, may result in structural and metabolic changes with which failure of absorption of fat and other substances may be associated. It would seem, therefore, that in the sprue syndrome deficiency of vitamins is not a constant feature; that the symptoms and signs observed indicate only a relative rather than a gross deficiency, and that a selected group of vitamins are involved, especially riboflavine, nicotinic acid, and possibly other members of the B complex. The diet of these patients is not usually deficient in these vitamins, so that the defect must be due either to adverse circumstances in the intestinal lumen, to defective absorption, or to faulty utilization. It may be coincidental that many of the associated deficiencies observed in cases of the sprue syndrome are concerned with substances which have a nutritional significance both to bacteria and to human subjects, and that bacteria are present in large numbers in the upper part of the small intestinal tract in the cases so far investigated. It does not seem impossible that competition might arise between the nutritional demands of these organisms and the host, somewhat analogous to that observed with other intestinal parasites. Further investigations on a quantitative basis must decide whether these deficiencies are due to some such competitive phenomenon, to malabsorption, or to faulty utilization. It may, however, be concluded that vitamin deficiencies, possibly excluding choline, are probably not concerned with the aetiology of the fat-absorption defect in the sprue syndrome.

Distributive Phase of Fat Absorption

It can be shown by experiment that fatty acids mainly pass up the portal vein to the liver, like other water-soluble materials, while triglycerides, absorbed largely in particulate form, take the lymphatic route and pass by the thoracic duct into the systemic circulation (Frazer, 1943a). It is obvious, therefore, that the proportion of fatty material which passes by these two alternative routes might be considerably varied without any great change in the total quantity of fat absorbed. Differences in the extent of the systemic lipaemia, probably due to the change in the proportion of fat absorbed in particulate form, may be induced in animals and human subjects by procedures designed to alter the extent of lipolysis (Frazer, 1943b). It has already been noted that many cases of defective fat absorption, especially in the sprue group, may absorb as much as 70% of ingested fat without any appreciable systemic sequelae. The amount of fat absorbed in these cases would normally give rise to a marked systemic lipaemia. It is of interest, therefore, to consider the factors that might be concerned in a change of distribution of fat from the lymphatic to the portal pathway.

It is clear that an obstruction to the lymphatic pathway might effectively prevent the normal systemic sequelae during fat absorption. It is interesting that in such cases, and in experimentally induced obstruction, the quantitative decrease in fat absorption is much less than might be expected, suggesting that when the lymphatic pathway is

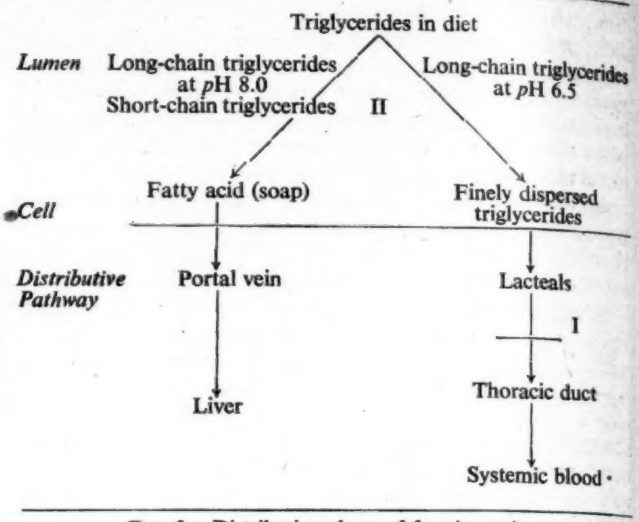

FIG. 3.—Distributive phase of fat absorption.

Possible Defects:

I. Lymphatic obstruction.
II. (*a*) *Primary* change in intraluminar environment or variation in dietary triglyceride.
(*b*) *Secondary* changes in intraluminar environment in cases of defective particulate absorption.

interrupted an increased proportion of fatty material passes by an alternative route. In the large majority of cases of defective absorption examined there is no evidence of obstruction to the lymphatic pathway, and alteration in the distribution of the fatty material must be dependent upon changes in the lumen or cells of the intestine.

It is generally agreed that hydrolysis of long-chain triglycerides is restricted to about 30% *in vitro* unless very specialized conditions prevail. It is, however, claimed that in the intestinal lumen the fatty acid formed is absorbed, and consequently hydrolysis proceeds rapidly to completion. It can, however, be shown that the restricting factor in hydrolysis of long-chain triglycerides is the accumulation of fatty acid at the interface of the oil globules rather than accumulation in the water phase. This restriction can be overcome only by the removal of the fatty acid into the water phase, which is necessary before its absorption from the lumen of the intestine can occur. This has only been achieved experimentally to any significant degree by conversion of the fatty acid into soap. The formation of soap in this way is largely conditioned by the *p*H of the environment, being very slow at *p*H 6.5 but more effective at *p*H 8.0. It may also be noted that the optimum *p*H for the action of pancreatic lipase is 8.0 to 8.5, and the activity of the enzyme is considerably diminished at *p*H 6.5. If the hydrolysis of a short-chain triglyceride, such as tributyrin, is studied, restriction does not occur, since the butyric acid is water-soluble and can be freely removed from the interface, independently of the *p*H of the environment.

In the lumen of the normal intestine the *p*H of the contents of the upper two-thirds is 6.5, while a more alkaline reaction, up to *p*H 8.0, may occur in the lower end of the ileum. The hydrolysis of long-chain triglycerides is therefore likely to be restricted in the upper part of the small intestine, but more extensive breakdown might occur towards the lower end. Since active absorption of fat is known to occur from the mid-duodenum downwards, it must be concluded that long-chain triglycerides are absorbed mainly in particulate form in the upper intestine, but a greater proportion may pass through as fatty acid in the

ileum. Tributyrin, on the other hand, will be rapidly hydrolysed and absorbed as fatty acid. In this connexion it may be significant that the absorption of tributyrin is not affected by adrenalectomy (Bavetta and Deuel, 1942), and tributyrin is not found in the chyle (Hughes and Wimmer, 1935) or in the fat depots (Davis, 1930). The behaviour of triglycerides containing fatty acids of chain length intermediate between these two extremes is not yet known. It is of some interest, however, that the tolerance of patients with fat-absorption defects to different dietary fats appears to vary considerably.

If the *p*H in the upper part of the small intestine can be altered towards the alkaline side, more extensive hydrolysis might occur, with a corresponding decrease of particulate and increase of fatty acid absorption. The effect of such a change on the total efficiency of the fat-absorption mechanism is not known, but it seems unreasonable to suppose that the absorption of fatty acid from the intestine is already maximal under normal circumstances. Thus the sequelae associated with particulate absorption would be suppressed, but the total quantity of fat absorbed might not be greatly altered. Such a change might be a primary factor in the alteration of the fat-absorption pattern, or it might be secondary to a defect in particulate absorption. It is known that changes in the intestinal environment occur in a number of cases of defective fat absorption, but whether these are primary or secondary, or to what extent they are significant, has not yet been established. It may, however, be concluded that fat can be absorbed by at least two distinct mechanisms, each of which uses a different distributive pathway. The proportion of fat which is absorbed in particulate form may be reduced, with a corresponding increase in fatty acid absorption. Such a mechanism would provide the flexibility which is apparent in cases of defective absorption. The main factors which seem to be concerned in changes in the distributive phase, apart from obstruction to the lymphatic pathway, are the *p*H in the intestinal lumen and the composition of the dietary triglyceride.

The original material contained in this paper is largely due to the efforts of a number of colleagues in Birmingham with whom it has been my privilege to work. I am particularly indebted to Prof. T. L. Hardy and Dr. W. T. Cooke for guidance in the clinical field; to Miss M. D. Thompson for most of the clinical investigations, especially the intubation experiments; to Dr. H. G. Sammons and to Dr. Garfield Thomas for biochemical assistance; to Dr. A. L. Peeney for bacteriological studies; to Dr. J. M. French and Mr. P. E. Sagrott for assistance with the experimental work; and to the Medical Research Council and the Sir Halley Stewart Trust for their financial help.

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SOME PROBLEMS OF TROPICAL SPRUE*

BY

D. A. K. BLACK, M.D., M.R.C.P.
Lecturer in Medicine, University of Manchester

AND

L. P. R. FOURMAN, M.D., M.R.C.P.
Assistant, Nuffield Department of Clinical Medicine, Oxford

Before describing some of our observations in early tropical sprue it will be well to make two introductory digressions —the first on current views of fat digestion and absorption, the second on the type of patient with whom we were dealing.

Fat Digestion and Absorption

The classical view, of which a full statement is given by Bloor (1943), maintains that any absorption of dietary fat is preceded by splitting of the fat into glycerol and fatty acid. The glycerol is absorbed as a simple water-soluble substance and the fatty acid is absorbed as a water-soluble complex with bile salts, as cholesterol ester, or as phospholipid. The importance of phosphorylation in the absorption of fatty substances has been emphasized by Verzar, but not all of his supporting data have been confirmed.

Over the past ten years or so Frazer (1946) and his coworkers have collected a substantial body of evidence in favour of his "partition hypothesis" of fat absorption. In his view some of the fat is absorbed without preliminary splitting, so that there are two virtually independent channels of fat absorption. Neutral fat is absorbed as a very fine emulsion, and Frazer has described an emulsifying system of bile-salt–monoglyceride–fatty-acid which is adequate to produce an emulsion of the required fineness. Moreover, absorbed neutral fat enters the lacteals, and ultimately the systemic blood stream, where it may be visible as finely divided fatty particles known as chylomicrons; split fat, on the other hand, enters the portal blood stream and may therefore be absorbed without necessarily increasing the chylomicrons in the systemic blood. In support of his view Frazer has shown that liquid paraffin, which cannot be "split," can yet be absorbed if it is emulsified sufficiently. If rats are given a fatty meal with added lipase, so that splitting is practically complete, fatty particles are demonstrable in the portal blood; if, on the other hand, the fatty meal is treated with sodium cetyl sulphate, which inhibits lipolysis, fatty particles are found in the thoracic lymph and not in the portal blood stream.

Our own limited experience in this field has convinced us of the correctness of Frazer's views, with two minor reservations on quantitative grounds. The possibility of neutral fat absorption seems to be proved, but what proportion of the dietary fat is absorbed in this way is still uncertain; secondly, we found the chylomicron count was of very limited value as a measure of fat absorption, in view of the great variation in the size of the particles seen, which meant that identical "counts" might represent very different amounts of "chylomicron-fat."

Clinical Features of Early Sprue.—This is not the place for a clinical description of the textbook type, but it may be said that all the patients investigated showed loss of weight, abdominal distension, and fatty stools. Tongue changes were less constant, and anaemia of any severe degree was uncommon, nor was it necessarily macrocytic in those patients who showed it. Tetany and bone changes

* Based on a lecture given by one of us (D. A. K. B.) at the British Postgraduate Medical School.

were not seen, perhaps because alimentary absorption of vitamin D is not as essential in a tropical as in a temperate climate. About one patient in ten had profuse watery diarrhoea in place of the more usual bulky formed stools; such patients tended to go downhill rapidly, with low blood pressure, asthenia, and dehydration—a type of the disease which may be referred to shortly as "severe sprue."

Objects of the Investigation.—Although much work has been done on the clinical and haematological aspects of sprue, notably by Castle *et al.* (1935) in Porto Rico, there is surprisingly little information on the quantitative aspects of fat absorption. Since the steatorrhoea is one of the outstanding features of sprue, it was decided that our main aim should be to collect data on fat absorption in early cases and see how the absorption might be affected by different forms of treatment. Some data were also obtained on the absorption of non-fatty substances, and an attack was made on the problem of "severe sprue," already referred to.

Fat-absorption Studies

Three methods of studying fat absorption were used—chylomicron counts, serum lipid curves (Black and Simpson, 1947), and fat-balance experiments (Black, Bound, and Fourman, 1947). As experience with these various methods grew we found ourselves relying more and more on the fat-balance technique, but the results of the other methods may be briefly described. Chylomicron curves turned out to be fairly normal in most cases of early sprue. In some patients the chylomicron curve was below the rather wide normal range; but this type of curve was constantly present only in those patients who had profuse watery diarrhoea. Serum lipid curves were obtained by giving a standard meal of tinned milk containing 18 g. of fat, and analysing samples of serum taken off fasting, and 2½, 3, 3½, and 4 hours after the meal. The total fatty acid, cholesterol, and lipid phosphorus were directly determined, and from these data values were calculated for cholesterol-ester fatty acid, phospholipid fatty acid, and, by difference, neutral-fat fatty acid.

There was a significant difference between the fasting values in nine normal subjects and 16 patients with sprue; the total fat in the sprue patients was only slightly lower than in the normal subjects, but the cholesterol and phospholipid fatty acid was markedly lower, while the neutral fat was actually higher in the sprue patients. After the meal the increment in total fatty acid in the sprue patients was only about half that in normal subjects; neutral fat increment was much less affected than phospholipid fatty acid increment, while cholesterol fatty acid showed an actual fall in the sprue patients after a fatty meal. Unfortunately the normal range of fat curve was very wide, so that in the individual patient with sprue the curve might well fall within the normal range. This impairs the value of fat curves both in diagnosis and in investigation.

Fat-balance Experiments

Two diets of known fat content were available to us—one containing 65 g. of fat a day, the other 95 g. We measured the total output of fat in the stools and by subtraction from the dietary fat arrived at the total amount of fat absorbed; this, when expressed as a percentage of the dietary fat, may be termed the percentage fat absorption. Questions of interpretation arose very early in the course of this work.

1. It was found that the variation between successive four-day stool collections was very great, and in order to reduce error from this cause we have considered all our results in terms of twelve-day periods.

2. Any true intestinal excretion of fat will introduce error into this assessment of fat absorption. It was found, however, that sprue patients on a low-fat diet excreted no more fat than normal people, so true excretion of fat can introduce only a small systematic error.

3. As patients originally on a 65-g. fat diet improved under treatment it often became necessary to increase their diet to 95 g. of fat a day. In five patients in whom this was done the percentage fat absorption was found not to change significantly. Apart from its practical bearing on the validity of percentage fat-absorption measurements on different diets, this result has some theoretical significance. It suggests that the impairment in absorption is not a fixed mechanical deficiency, as added fat would in that case be excreted quantitatively and the percentage fat absorption would decrease in the higher diet. On the other hand, an alteration in one of the enzyme systems connected with fat absorption would be expected to give this type of result. It is also possible, of course, that on the higher fat diet the increase in the gastric emptying time is great enough to ensure that the amount of fat actually presented to the intestine for absorption in unit time is not increased. From a more practical point of view it is to be noted that the increase in the fat content of the diet in these patients was a very moderate one, and our results do not conflict with the general experience that it is inadvisable to give large amounts of fat to patients with active sprue. Normal people taking a mixed diet containing 50 to 100 g. of fat a day will absorb over 90% of the dietary fat. In 28 patients with early tropical sprue we found that the fat absorption ranged from 50 to 85%. There was, therefore, with this method of assessment a clear-cut distinction between normal people and sprue patients, a distinction which was conspicuously lacking with the other methods which we tried as measures of fat absorption.

It is to be noted that Cooke *et al.* (1946), using a fat-balance method, also found a different range of fat absorption in normal subjects and in patients with idiopathic steatorrhoea. Results of this type commend the fat-balance technique, in spite of its tedium, as a means of assessing the severity of steatorrhoea and following progress under treatment.

In therapeutic trials with nicotinic acid and riboflavine in large doses the patients showed no improvement either in their clinical state or in fat absorption. With large doses of a crude liver extract given parenterally there was rapid clinical improvement, with gain in weight and well-being and improvement in the character of the stools. In spite of this the percentage of fat absorption showed no detectable change in several weeks of liver therapy and thereafter improved only slowly as the patient's general state approached the normal. When yeast extract in a dose of 15–20 g. daily was given to patients while on their liver treatment there was some improvement in fat absorption within the first twelve-day period. We had not the opportunity ourselves to observe the effect of folic acid in tropical sprue, but results reported by Davidson *et al.* (1947) suggest that it has an action rather like that of crude liver extract and inferior to yeast extract, at least as regards fat absorption.

Absorption of Non-fatty Substances

Apart from glucose, the absorption of non-fatty substances in sprue has been little studied; yet it would seem important in considering the aetiology of the disease to know whether the impairment of absorption is general or whether it is limited to a few substances—such as fat—absorption of which may present some special difficulty, or perhaps even whose failure to be absorbed is more readily apparent from secondary effects on the stools. If unabsorbed carbohydrate were as easily recognized in the stools as unabsorbed fat the demonstration of impaired carbohydrate absorption in sprue might not have to be based on the equivocal evidence of blood-sugar curves, so easily modified by non-absorptive factors. The evidence which we obtained on the question of non-fatty absorption in tropical sprue is mostly indirect, for the balance technique of studying absorption cannot

be applied to substances such as glucose or amino-acids. Some general impairment of absorption was suggested by our finding that in the active stages of sprue the dry weight of the stools was increased to a greater extent than could be accounted for by their increased fat content. Using indirect methods, we confirmed that glucose absorption is often impaired, and we also found some evidence of faulty absorption of iron, sodium, and chloride in certain cases. On the other hand, iodide and amino-acids were abnormally absorbed. Iodine is absorbed from the stomach and so is rather a special case.

The satisfactory absorption of amino-acids does show, however, that the intestinal absorption defect is not universal; the exact process involved in amino-acid absorption is not known, but absorption is more rapid than can be accounted for by simple diffusion (Höber, 1945). Fourman (1947) has found evidence of impaired xylose absorption in sprue: this may imply a more fundamental absorption defect than that shown by flat glucose curves, since xylose absorption, unlike that of glucose, is not inhibited by phloridzin and may therefore be produced by a different and simpler mechanism.

In summary, the evidence suggests that there is in fact a fairly general impaired absorption in sprue, and that fat malabsorption has been first observed only because its effects on the stools are more obvious.

Salt Deficiency

In preliminary work on the syndrome described above as "severe sprue" it was found that the serum sodium and chloride were both low. A balance experiment showed that large amounts of sodium and chloride were being lost in the watery stools, and that sodium was practically absent from the urine although chloride was still present in about half the normal amount. This is the biochemical pattern of salt deficiency (Black, 1946) accompanied by some acidosis; the absence of sodium from the urine is very much against suprarenal insufficiency being the cause of the hypotension—a suggestion made by Thaysen (1932). The persistence of some chloride in the urine may be misleading if reliance is placed on the urinary chloride alone in detecting salt deficiency in this type of patient.

Conclusion

We would emphasize the two findings which seem to us of practical therapeutic significance. The first is that yeast extract in large doses has a favourable effect on fat absorption: we have seen clinical benefit from yeast treatment in patients with chronic sprue in this country, and it is more convenient for the patient than frequent injections of crude liver extract. Secondly, a number of patients with sprue became acutely ill, with salt-deficiency dehydration associated with watery diarrhoea; in such patients the diarrhoea must be controlled with sulphaguanidine and parenteral liver, and their diet should also be supplemented with moderate amounts of salt.

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SHOCK IN OBSTETRICS

BY

W. A. SCOTT, F.R.C.S.Ed., F.R.C.O.G.

Professor Emeritus in Obstetrics and Gynaecology, University of Toronto

The essential mechanism of surgical shock is yet to be definitely established. It is understandable, therefore, that the physiologists and experimental surgeons desire to keep surgical shock in a special category until the mechanism of its inception may be discovered. As regards this subject I am neither a physiologist nor an experimental surgeon, and I speak, therefore, simply as a clinician. To the clinician there is a group of cases characterized by circulatory deficiency, with low blood pressure, decreased blood volume, decreased cardiac output, and increased concentration of blood that present a common clinical picture irrespective of the primary cause. These patients present a group of symptoms and not a disease. The prevention and treatment of these are of primary importance, and whether there is a special kind of shock called "obstetric shock" occurring in normal women after normal labour is of little importance. At one time it was customary to attribute a certain number of sudden deaths during or after labour to primary shock; but Sheehan, as well as other observers, has made it quite clear that in the great majority, if not all, of these cases necropsy will reveal some condition sufficient to account for the fatality.

In all urban centres the number of maternal deaths certified as due to "shock" is a great deal less than it was twenty-five years ago. Of 122 maternal deaths during a two-year period from May, 1938, carefully evaluated by the Department of Health and Welfare of the Province of Manitoba, five were originally attributed to "strain and shock." Two of these, on review of the clinical history, were obviously due to internal haemorrhage, and the other three, on review, could not easily be attributed to shock. All five of these patients were delivered at home, remote from hospitals, and necropsies were not done.

Table I is an analysis of the maternal deaths with clinical evidences of shock in the Province of Ontario for 1943, the last year for which complete data were available.

TABLE I.—*Maternal Deaths Accompanied by Shock: Province of Ontario*, 1943

Total live births		81,173
Maternal deaths—exclusive of ectopic gestation (14)		189
Maternal deaths with clinical evidence of shock		82
Pulmonary embolism	33	
Haemorrhage	31	
Failed forceps and version	5	
Difficult forceps	5	
Rupture of the uterus	5	
Acute dilatation of the stomach (necropsy)	1	
Normal delivery with severe hypertension	1	
Normal delivery with no apparent haemorrhage (no necropsy)	1	

It will be seen that at the most only 11 of these did not have definite lesions accounting for the shock, and of the 11 there were 5 versions after failed forceps and 5 difficult forceps cases, in most, if not all, of which there was probably severe injury to the birth canal, with haemorrhage.

It is my opinion that, from the clinical point of view, the great majority of cases of obstetric shock can be evaluated in terms of haemorrhage. That is not to say that other causes of shock do not occur in the parturient patient: it is to say that they are relatively infrequent.

Table II summarizes the cases of shock on the public ward service of the Toronto General Hospital for the period 1931–43.

In the third group, with a blood loss of more than 1,000 ml., it will be noted that there were 6 deaths. Two of these were cases of placenta praevia; both had severe haemorrhages before admission and were bleeding when

admitted. Both cases had immediate transfusion and were treated by version. I would like to point out that this method of treatment is rarely employed in our service, and that there were particular circumstances which seemed to warrant it in these instances; but probably both cases were errors of judgment. One of these patients died following post-partum haemorrhage. The second patient recovered from her shock, had a spontaneous delivery but a post-partum haemorrhage, and died in two hours in spite of further transfusion.

TABLE II.—*Toronto General Hospital*

Total deliveries, 12,749
126 cases with *blood loss* 500–700 *ml.* and/or signs of *mild shock*
Recovered within 15 minutes
2 cases with mild shock and minimum blood loss but difficult deliveries
64 cases with *blood loss* 700–1,000 *ml.* and/or signs of *moderate shock*
Recovered within one hour
4 cases with moderate shock and minimum blood loss but difficult deliveries
9 cases of *blood loss more than* 1,000 *ml.* and/or signs of *severe shock*
6 deaths up to 6½ hours post partum.

The third patient had a large baby with a labour of 44 hours and a difficult forceps delivery; death was sudden and intra partum. There was no external evidence of haemorrhage, and there was no necropsy.

The fourth patient suffered from essential hypertension; labour was induced by rupture of the membranes followed by spontaneous delivery in 12 hours, and manual removal of a retained placenta was followed by progressive shock and death in three hours. No external bleeding occurred and there was no evidence of ruptured uterus; no necropsy was done.

The fifth case was one of normal pregnancy and spontaneous delivery. Post-partum haemorrhage was treated by oxytocics (ergometrine and pituitrin) and eventually the uterus was packed. Progressive shock followed, and the patient died in 6½ hours despite repeated transfusions. There was no necropsy.

The last case was a normal pregnancy with a breech delivery. There was severe post-partum haemorrhage; treated as in the previous case but followed by death in 5 hours. At necropsy the bleeding was found to have been from the placental site and there was no uterine rupture.

Data of Three Cases of Severe Shock with Recovery.—The first of these was a spontaneous delivery with a severe post-partum haemorrhage but with recovery in 12 hours after transfusions. The second was a spontaneous delivery followed by inversion of the uterus and severe post-partum haemorrhage. The patient was transfused and the inversion reduced; recovery occurred in 6 hours. The third was a case of toxic accidental haemorrhage with a spontaneous delivery but severe post-partum haemorrhage. The patient was transfused, and when the haemorrhage persisted hysterectomy was carried out two hours post-partum, being followed by recovery.

Factors in Development of Shock

During pregnancy there is an increase in the blood volume, which is a favourable circumstance; but with delivery there is an inevitable loss of blood, which may more than overcome the increased volume of pregnancy. The great increase in the size of the uterus, full of large blood sinuses, results in an organ capable of holding a considerable volume of blood when it is relaxed; and its relaxed condition, after being emptied, provides a fertile source of haemorrhage into the uterine cavity.

Disturbance of water balance, which is usually the first indication of toxaemia, is probably evidence of increased permeability of the capillaries, and this, of course, is one of the essential factors in the mechanism of shock. Toxaemic cases with systemic oedema withstand trauma poorly.

The late toxaemias of pregnancy are accompanied by an elevation of blood pressure, which may reach high levels. If convulsions supervene, and even in the absence of eclampsia, after delivery there is often a very sudden drop in pressure, which is conducive to the onset of shock. During labour the patient is subjected to various types of trauma. To this are often added sleeplessness and apprehension. There is the final mechanical trauma of delivery, which varies from a slight degree of damage to severe injury.

Immediately after delivery there is a marked lowering of intra-abdominal pressure, which probably results in dilatation of the splanchnic blood vessels. This lowering of the intra-abdominal pressure occasionally results in small-bowel distension of such a degree that it may simulate paralytic ileus, and it probably renders the patient more susceptible to shock.

Let us now consider shock in connexion with the various obstetrical accidents.

Shock due to Obstetrical Mishaps

Haemorrhage.—This, the most important of the obstetrical accidents, may be the result of placenta praevia. The haemorrhage may be slow and prolonged or sudden and rapid, but in either case the blood loss may be sufficient to result in shock. From clinical observation it would appear that a patient suffering from a rapid loss of a considerable amount of blood responds to therapeutic measures better than one who has lost a comparable amount over a longer period of time. In accidental haemorrhage blood loss may be equal to that from severe placenta praevia, but in many instances the shock is out of proportion to the observed blood loss. This is especially true in cases of Couvelaire uterus, or toxic utero-placental apoplexy, in which there is an infiltration of the uterine wall with blood separating the muscle bundles and producing a ligneous, non-contracting uterus. To this is added the fact that practically all of these patients are suffering from a more or less severe toxaemia. In concealed accidental haemorrhage it is difficult to estimate the loss of circulating blood, especially where conservative methods of treatment are the rule, as in our hospital. It may be that the trauma to the uterine musculature is the important factor, but I believe that blood loss is more important. And, finally, there is post-partum haemorrhage of two types—haemorrhage following trauma with tearing of the birth canal, and bleeding due to failure of an atonic uterus to contract and shut off the blood sinuses. In most instances the haemorrhage is external and therefore apparent, but occasionally when it results from injury to the birth canal it may be entirely within the pelvis as a retroperitoneal haematoma, or occasionally as an intraperitoneal haemorrhage.

Rupture of the Uterus.—This mishap is probably more common than is recognized clinically. It is most common through the scar of a previous section, next after difficult operative deliveries; but it sometimes occurs spontaneously even in unobstructed labours. It would appear that rupture of the uterus *per se* seldom produces clinical evidence of shock, and when the latter develops it is secondary to haemorrhage. In Eastman's series shock was present in less than half the cases of scar rupture, and in one-third of the cases of spontaneous rupture vaginal delivery was carried out without realizing that rupture had occurred. I have seen three cases of complete and one of incomplete rupture with no evidence of shock. It is obvious that the bleeding must have been slight in these instances.

Inversion of the Uterus.—Inversion may occur spontaneously or be due to unskilful management of the third stage of labour. A considerable number of these cases

show shock quickly. A large proportion of the remainder will subsequently go into shock either as the result of haemorrhage or from attempts at replacement, which are frequently accompanied by bleeding, often profuse. All cases of puerperal inversion of the uterus should therefore be looked upon as potential cases of shock, and prophylactic measures against this condition should be at once instituted, before any attempt at its correction is carried out. Nevertheless, all cases of acute inversion do not show shock. During the past ten years we have seen seven cases of acute inversion: one had profuse bleeding with severe shock; two had moderate haemorrhage and moderate shock; the other four cases had no evidence of shock.

Eclamptic Toxaemia.—Hailey, Schwartz, and Adair, as well as other observers, have pointed out that marked vasomotor collapse is sometimes the cause of death in eclampsia, and even in pre-eclampsia. Hunt and Adair collected eight cases in which the systolic pressure dropped by 100 to 200 mm. within a few minutes, and all of these cases showed clinical evidence of shock. Rapid delivery or deep anaesthesia may aggravate a potential case. On the other hand, it is known that hypertension cases of both sexes stand operation well. The collapse that follows delivery in cases of hypertension is probably explained by a sudden lowering of the intra-abdominal pressure with a filling of the splanchnic vessels with non-circulating blood. When death does not result quickly from the shock it may occur later from damage to the central nervous system due to cerebral anaemia. MacGlamman has pointed out that during caesarean section on non-eclamptic cases there is no marked drop in blood pressure; whereas if the section was done in the case of eclampsia the fall in pressure as the uterus was emptied was frequently great—in one case 90 mm. in a period of 40 minutes.

Psychic causes during labour occasionally result in syncope. It is a debatable question whether such causes may produce true shock. Some observers believe that it does, and Miles Phillips thinks that emotional factors are important in the production of shock, and quotes a fatal case of Whitridge Williams's. DeLee also was of the opinion that this was sometimes a factor of importance. In Crile's theory of shock the aetiology was thought to be a combination of fear and anxiety with pain, leading to a state of mental and physical exhaustion, and eventually to shock. In any event, fatigue and starvation after prolonged labour should not be labelled "shock."

Management of Obstetric Shock

It is much easier to prevent the onset of shock than it is to treat the condition after it has become established. If the obstetrician has constantly in mind those conditions leading to shock, most particularly haemorrhage, he will make every effort to obviate them and to provide for their treatment before constitutional symptoms have made their appearance. In the case of haemorrhage the blood loss should be replaced as rapidly as possible, but of more importance is to try to prevent any undue bleeding. In cases suffering from hypertension delivery should never be rapid, and after delivery, if there is any marked drop in blood pressure, a tight abdominal binder should be applied, and to this may be added the weight of a sandbag. Mechanical trauma should be kept to a minimum, and when it occurs should be recognized and treated. As I have already pointed out, in all cases of inversion of the uterus anti-shock therapy should be instituted at once, even if shock has not yet developed.

In the active treatment of shock the first requisite is the abolition of pain and apprehension by the administration of morphine. Means should be taken to retain the body heat. A temperature of 90 to 100° surrounding the body should not cause damage. In our hospital such heat is supplied in the form of warm air, thermostatically controlled by an electric heater, and no heated bottles or pads are placed in the patient's bed. The replacement of the circulating blood volume, however, is the prime essential, and any loss of time in this procedure should be avoided. In the larger hospitals to-day blood banks are usually in operation, and therefore a transfusion of blood or plasma should be available within ten minutes. Blood banks are not feasible in most of the smaller hospitals, and when these are situated at some distance from a blood bank a supply of plasma should always be on hand; to-day this is easily arranged. In cases without severe haemorrhage the plasma is of equal value with whole blood, and even when bleeding is profuse plasma is of great service. When delivery has occurred in a home, and particularly in rural districts, the obstetrician should always have facilities for the intravenous administration of glucose solution and should use it early.

Lastly, where shock has made its appearance, the trauma of any operative procedure should be avoided except where such procedure is necessary to stop active haemorrhage. In placenta praevia measures to stop the haemorrhage should be carried out while the replacement of the lost blood is going on. Indeed, when operative measures for placenta praevia are contemplated, even where there has as yet been no great blood loss, a transfusion prior to or during operation is advisable to forestall possible haemorrhage during operation. In cases of accidental haemorrhage where shock does not exist I believe a conservative method of treatment is most apt to avoid its development. In most cases of Couvelaire uterus, with the patient already in shock, the active haemorrhage has usually ceased, and any blood that appears at the vulva is that which has already poured out into the interior of the uterus. The prime requisite, therefore, is to treat the shock and not to add to it by the trauma of operative delivery. If the patient does not respond to morphine, transfusion, and heat, operation would not have saved her life; if she does respond to such measures one usually finds that the uterus has regained its contractile powers and delivery proceeds normally. Our treatment of accidental haemorrhage is conservative. Where shock does not exist there is no question in my mind that this is emphatically the best attitude. In cases of toxic accidental haemorrhage it is usually the method of choice. There may be a place for caesarean section in the treatment of toxic accidental haemorrhage, but I believe the place is small. Where severe shock does not exist and the baby is still alive and viable section may be indicated in the interest of the child, and in a few cases where fresh haemorrhage continues to occur and labour does not supervene it may be indicated after the shock has been treated.

Summary of Conclusions

From the clinical point of view the great majority of cases of obstetric shock are directly proportional to the amount of blood loss. This loss may be apparent or it may be concealed.

When confronted with a case of obstetric shock without obvious cause the history should be meticulously reviewed from the standpoint of possible causes of concealed bleeding, especially rupture of the uterus.

The prevention of haemorrhage is of first importance, but the replacement of lost blood is the *sine qua non* of treatment. Where haemorrhage is anticipated transfusion should be started before operative procedures are carried out.

With the first evidence of shock treatment should be started promptly before the condition has become irreversible.

In obstetric hospitals where blood banks have not yet been established supplies of plasma should be available at all times.

BREAST-FEEDING IN ERYTHROBLASTOSIS FOETALIS*

BY

I. A. B. CATHIE, M.D.

Clinical Pathologist, the Hospital for Sick Children, Great Ormond Street, London

Rh antibodies are frequently demonstrable in the breast milk of mothers who have borne erythroblastotic babies, and the suggestion has several times been made that the ingestion of such milk might have a deleterious effect upon the recovery of an infant whose blood cells had already been subjected to the action of maternal antibody. More recently Cappell (1946) and Davies (1947) have reported cases in which a lag in recovery in the blood state of babies with erythroblastosis foetalis was apparently overcome by weaning.

If this view is correct it should be possible to show that antibodies are not destroyed by gastric juice and that they are absorbed into the circulation. As the question of weaning or breast-feeding in these cases is of considerable importance the following investigations were undertaken to try to determine which course should be pursued.

Investigations

The fasting gastric contents were obtained from 20 babies varying in age from 1 week to 1 year; a wide range of gastric acidity was present. Equal volumes of gastric secretion and serum with a high Rh antibody titre were incubated together. At the end of an hour's incubation at 37° C. no fall in titre was found in any case, indicating that Rh antibodies are not readily destroyed by the gastric juice.

To try to demonstrate absorption from the stomach, serum containing antibodies was fed by mouth, and blood samples were taken at intervals thereafter and tested for antibodies. In each case Rh antibody was used which had been shown previously *in vitro* to be able to agglutinate the red cells of the recipient. Absorption was tested for by the ability of the serum to agglutinate red cells of the same Rh type, and at the same time blood counts were done to check the possibility of any *in vivo* agglutination leading to anaemia. The red cells were tested for sensitization by the direct method, and in all cases the power of the serum to sensitize other Rh-positive cells was investigated by the indirect method of Coombs, Mourant, and Race (1945). These are much more sensitive methods than the ordinary tests for agglutinins, the rabbit anti-human globulin serum detecting traces of antibody when direct agglutinating techniques are completely negative.

First, an Rh-positive volunteer drank 15 oz. (426 ml.) of serum with an anti-Rh titre of 256 without any untoward results. There was no fall in the blood count, and blood taken at intervals during the next 48 hours showed no agglutinin. The cells did not become sensitized and the serum failed to sensitize other Rh-positive cells.

Next, 12 Rh-positive babies suffering from such conditions as inoperable spina bifida were fed for a complete day with high-titre serum—again with complete failure to demonstrate any antibody absorption.

Thirdly, the direct Coombs test was done daily on a baby with erythroblastosis. On the day the test became negative traces of antibody undetectable by the most sensitive methods might reasonably be assumed to have been present. On this day and for the subsequent 24 hours only high-titre serum was fed, and again no sensitization of the red cells occurred and no antibody could be demonstrated.

Lest there might be some difference between the absorption of antibodies from serum and breast milk the same investigation was carried out, but on the day the Coombs test became negative the baby was put on to breast milk containing an anti-Rh titre of 32. The baby's red cells did not become resensitized, and antibody was not otherwise demonstrable in the serum.

In these investigations complete antibody was used. The series was completed by repeating the observations on babies with haemolytic disease but using incomplete or blocking antibody. Again no evidence of absorption was found.

Comment

Infants suffering from erythroblastosis, of either icteric or haemolytic preponderance, differ widely in the severity of the disease and in their response to blood transfusion therapy. Whereas in some a single transfusion will produce a satisfactory blood level which is maintained, in others the haemolytic process appears to continue after the red cells are no longer sensitized by agglutinin and, indeed, at times when all the original cells have been demonstrably replaced by group O Rh-negative blood. Yet in these refractory cases there is usually a point when lysis ceases, transfused cells are maintained, and the blood count starts to rise of its own accord. In view of the failure to show any absorption of mouth-fed antibody into the infant's blood it may be that in those cases where weaning has appeared to overcome a refractory anaemia the time of weaning has coincided with the time of spontaneous recovery, and that the relationship between the two is more apparent than real.

The same rather dramatic onset of blood regeneration in the more refractory cases may sometimes be observed in infants breast-fed from birth, and also in others which have been only artificially fed. This regeneration characteristically is seen in the second month of life, a time when weaning to avoid breast-milk antibodies has appeared to effect an improvement.

It is possible, as Emery (1947) suggests, that traces of antibody insufficient to be harmful may be absorbed, but if so they are not detectable by present methods. The advantages of natural over artificial foods need no elaboration, and for an erythroblastotic baby with haemolytic anaemia and a depressed marrow the disadvantages of artificial feeding should be avoided so far as is possible. It has been the practice at the Hospital for Sick Children to breast-feed such infants whenever this can be done, irrespective of the breast-milk antibody content, and their clinical progress has not suggested any relationship between milk antibodies and the duration of the haemolytic process.

Summary and Conclusion

Investigations are described which show that Rh antibodies, although not readily destroyed in the stomach of infants, are not demonstrably absorbed into the blood stream.

It is concluded that the weaning of infants with haemolytic disease because the maternal milk contains antibodies is not justified.

I am indebted to the physicians of the Hospital for Sick Children for access to their cases, and to Mr. G. W. Cecil for much technical assistance.

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RESIDUAL SUBACUTE AND CHRONIC PROSTATITIS AFTER PENICILLIN AND SULPHONAMIDE THERAPY IN ACUTE GONORRHOEA

BY

F. C. BOURGAULT DU COUDRAY
Captain, R.A.M.C.; Graded Venereologist

The condition I am about to describe has not, so far as I am aware, been given any prominence in the current literature. As a result of careful personal observation in Mauritius, East Africa, and Cyprus (and so presumably throughout the Tropics and sub-tropics), covering a period of 4½ years' continuous V.D. practice in the Army, I can affirm that subacute and chronic residual prostatitis after chemotherapy in acute gonorrhoea is of very widespread occurrence, and gives rise to physical signs as long as it remains untreated. Under chemotherapy I include treatment by the sulphonamides, as I consider that, from a purely therapeutic point of view, penicillin has only one advantage over the sulphonamides in gonorrhoea—that there is no evidence of penicillin resistance or "fastness" so far as the gonococcus is concerned. Hence, when the sulphonamides act favourably, they are therapeutically as effective as penicillin.

If the following are accepted as the criteria of cure in all cases of urethritis—(1) a persistently clear urine, (2) a persistently "dry" urethra, (3) a prostate which feels normal on palpation per rectum, and (4) a prostatic fluid which is macroscopically clear, and which, when fixed and stained, shows microscopically no pus cells, or at most only a few (not more than two or three in any field)—then I have found that after chemotherapy in *every* case of acute gonococcal urethritis return to normal is disappointingly infrequent. The departure from normality which occurs most often after treatment is the above-mentioned residual prostatitis, which fails to respond to further chemotherapy.

Clinical Features

The signs (there are no symptoms) of such a prostatitis may be the following:

1. Persistence of slight watery mucoid, or viscous opalescent or milky mucopurulent urethral discharge, which may be manifest only in the morning, or which may occur throughout the day. Microscopical examination of such a discharge will show mucus, either amorphous or inspissated; relatively few pus cells; small squamous epithelial cells from the urethra; and no organisms, or only scanty secondary organisms, such as Gram-positive cocci or bacilli. No gonococci can be detected after penicillin.

2. Persistence of mucus in varying quantities in the urine, with finely granular epithelial debris in suspension, or coarser sinking debris or small "comma" threads.

3. A palpably diseased prostate on rectal examination. It is difficult to describe the palpable features of a normal prostate: it is much easier to describe an abnormal one. The types of abnormality encountered are threefold: abnormality of size, shape, and consistence, depending on the severity and the duration of the prostatitis when first examined. Except in well-advanced cases, however, the physical signs appear to bear little relation to chronicity. In the early stages of prostatic involvement it may be difficult or impossible to assess the condition of the prostate by palpation alone, but by constant practice minor departures from the normal can be accurately assessed.

The physical signs of prostatitis are as follows:

(*a*) The whole prostate may be symmetrically enlarged—that is, both lobes are prominent with a well-marked median raphe or furrow between them. It may be boggy in consistence or it may be tense or turgid. Such turgidity, however, will yield when the prostate is massaged—that is, the lobes are comparatively soft and yield to the palpating finger when pressure is exerted upon them.

(*b*) The prostate may be symmetrically enlarged and smooth but of a rubbery consistence. This stage is reached surprisingly quickly in the course of prostatic infection. In this case greater pressure is required to produce any depression in the lobes by the examining finger.

(*c*) There may be unilateral enlargement. One lobe (usually the left) is enlarged and turgid or rubbery.

(*d*) One or both lobes may be not only enlarged but irregular in shape and consistence—that is, nodular. The nodules are portions of the prostatic lobe which are harder than the rest. There may be only one such nodule in either lobe.

(*e*) Finally, the whole prostate may be somewhat shrunken, nodular, and hard, and no amount of pressure exerted upon it by the massaging finger will produce any impression. Such prostates are very difficult to drain. As it is virtually impossible to examine histological sections of such prostates, one can only suppose that the increasing hardness is due to fibrosis.

4. A pathological excess of pus cells (polymorphonuclear leucocytes) in smears of prostatic fluid expressed by massage. It is interesting to correlate the physical signs in the prostate, ascertained by rectal palpation, with the microscopical appearance of stained smears of prostatic fluid. If this is done, a palpably diseased prostate will almost invariably contain an excess of pus cells in the prostatic fluid. The smears show pus cells in either great or moderate numbers. In the former case the macroscopical appearance of the prostatic fluid is worthy of note: it is opaque and distinctly yellow in colour. Normal prostatic secretion is semi-translucent and faintly bluish. Patients should, of course, be made to urinate immediately before prostatic massage. In chronic cases—that is, where the prostate feels hard and rubbery—prostatic smears may show pus cells in either large or small, widely separated clumps. There may also be a great admixture of mononuclear cells, which are almost certainly epithelial cells from the prostatic ducts, although they superficially resemble large lymphocytes or plasma cells. These epithelial plugs admixed with leucocytes constitute the small flocculent debris which can be seen floating in the prostatic fluid in these cases.

In my experience it is rare to find organisms of any kind microscopically in such pathological prostatic smears. Out of hundreds of such smears that I have examined microscopically I have found gonococci in only three, and secondary bacilli in about the same number. I invariably stain my prostatic smears with Loeffler's methylene blue, as not only is it a quick and clean method, but the leucocytes stand out conspicuously. Any organisms present are also easily detected, and a full staining by Gram's method may be performed subsequently if doubtful cocci are encountered.

It occasionally happens that a palpably abnormal prostate usually one of tough, rubbery consistence—will yield negative smears in which pus cells are absent or only scanty. Conversely, where a prostate feels normal a large number of leucocytes may be present in the fluid expressed from it; but by far the most constant and reliable evidence of prostatitis is the microscopical appearance of pus.

Such, then, is the clinical and microscopical picture of this condition. As it might be objected that the prostatitis in question may be the direct result of the methods employed to combat the original urethritis, or may be due to a pre-existing prostatitis, I will quote a few illustrative cases. I can affirm that the condition is discovered in the course of primary acute gonococcal infections, after penicillin therapy alone, in patients who have never had local treatment directed to the prostate or any form of mechanical or adjuvant treatment.

I was fortunate to enlist the help of Dr. R. M. Dowdeswell, a bacteriologist at the Medical Research Laboratory, when I was working at No. 87 (Nairobi) British Military Hospital, between April and June, 1946. Dr. Dowdeswell had approached me for help to enable him to carry out some

independent research of his own on the blood concentration of penicillin over a period of hours after a single subcutaneous injection of the drug, under different atmospheric temperature conditions. The sodium penicillin used in Dr. Dowdeswell's cases was dissolved in sterile doubly distilled " pyrogen-free " water, and admixed with the patient's whole blood in the proportion of 3 : 1 (three parts of penicillin solution to one part of blood). The mixture was shaken in the barrel of the syringe and allowed to stand for six minutes before being injected subcutaneously into the abdominal wall.

It is important that the condition of the prostate be ascertained, so far as possible, before commencing treatment in acute gonorrhoea. The only available method is palpation of the gland per rectum. If this is done in all cases, it will be found that the prostate is palpably abnormal in a fair proportion of them.

Illustrative Cases

Case 1.—Sgt. A., admitted to 87 British Military Hospital on May 24, 1946. Exposure with European woman about twelve days before admission. Used condom, followed by prophylactic packet one hour after exposure. Appearance of urethral discharge about ten days after coitus. First infection. On examination, purulent urethral discharge. Urethral smear showed intracellular gonococci ++. Prostate felt normal per rectum. On the 27th 150,000 units penicillin injected subcutaneously. Dr. Dowdeswell, dissatisfied with the results of the blood penicillin maintenance in this case, reinjected 150,000 units on the 30th. On June 4 his urethra appeared dry. Early-morning two-glass test showed almost clear urine, no debris, in both glasses. Per rectum the left lobe of the prostate felt enlarged and slightly rubbery. On the 7th his prostate was massaged, a smear made, and prostatic fluid was collected and cultured by Dr. Dowdeswell. The prostatic smear showed pus cells ++ with clumps of mononuclear cells ; the culture yielded two colonies of *Staph. albus* and two of diphtheroids.

Case 2.—Gnr. B. History of gonorrhoea treated in India with penicillin alone, 100,000 units, on April 16, 1946. Noticed slight urethral discharge two days before admission to 87 B.M.H. on May 14, 1946. On examination, scanty mucoid urethral discharge. An early-morning smear was sought for on the 15th, but none was found. Early-morning two-glass test showed clear urine with faint mucous cloud in suspension in both. Per rectum, lobes of prostate prominent and rather rubbery, Prostatic smear showed pus cells + +.

Case 3.—Cfn. C., admitted to 87 B.M.H. for penile sore on May 27, 1946. Exposure with half-caste woman ten days before admission. Used condom, followed by prophylactic packet three or four hours after coitus. Past history of syphilis in England ten years ago. He was absolutely certain that he had never had urethritis. On examination, small superficial non-indurated cribriform ulcer at muco-cutaneous junction of prepuce. No buboes. Blood Kahn negative. Dark-ground illumination negative for *Treponema pallidum* on three occasions. On the 29th he reported a purulent urethral discharge. Urethral smear showed intracellular gonococci ++. Per rectum the prostatic lobes felt prominent, smooth, and tense. Left lobe greater than right. On the 31st 150,000 units penicillin injected subcutaneously. On June 7 his urethra appeared dry. Two-glass test showed urine clear in both glasses. On the 12th his prostate was massaged, a smear made, and prostatic fluid was cultured. The prostatic smear showed pus cells +++ ; the culture yielded a few diphtheroids.

Case 4.—Cfn. D. Exposure on April 28, 1946, with African woman. First noticed urethral discharge on May 2. First infection. Admitted to 87 B.M.H. on May 4. On examination, viscous mucopurulent urethral discharge. Urethral smear showed gonococci ++. Per rectum the prostate felt normal. On the 5th 150,000 units penicillin injected subcutaneously. On the 9th two-glass test showed: 1st, slightly hazy with mucus and a few opaque threads in suspension ; 2nd, slightly hazy with mucus. Per rectum the prostate felt normal. On the 10th he had a slight mucoid watery urethral discharge. Two-glass test showed: 1st, very faintly hazy with mucus and a few small mucous shreds in suspension ; 2nd, clear. On the 11th his early-morning two-glass test showed: 1st, clear with small mucous cloud, containing granular debris, in suspension ; 2nd, clear, with small mucous cloud in suspension. He still showed a clear watery urethral discharge. On the 12th his urethra appeared dry. Urine was clear. On the 14th, reappearance of scanty mucoid urethral discharge. Two-glass test showed: 1st, almost clear, with small mucous shreds in suspension ; 2nd, clear. Per rectum, slight cord-like thickening of left lobe of prostate. Prostate massaged. Prostatic smear showed pus cells ++. Prostatic fluid was cultured by Dr. Dowdeswell ; culture yielded *Staph. albus.*

Case 5.—Cpl. E. Exposure with Seychelles girl thirteen days before admission to 87 B.M.H. on June 11, 1946. Used condom which broke. Prophylactic packet used half an hour later. Urethral discharge appeared eight days after coitus. History of gonorrhoea in Italy in August, 1945, treated with penicillin at No. 1 R.A.F. General Hospital. On examination, purulent urethral discharge. Urethral smear showed gonococci ++. Per rectum, prostate felt normal. On the 12th 150,000 units penicillin injected subcutaneously. On the 16th his urethra appeared dry. His urine was hazy with mucus and contained dense sinking threads +. Per rectum the prostate felt uniformly enlarged, smooth, and tense. On the 17th the prostate was massaged, and prostatic fluid was collected and cultured by Dr. Dowdeswell. Prostatic smear showed pus cells +++ ; the culture was sterile.

Case 6.—Sgt. F. Exposure with African woman sixteen days before admission to Military Hospital, E.A.A.M.C., Nairobi, on July 30, 1947. Used condom, but no prophylactic packet. Urethral discharge appeared on July 27. First infection. On examination, purulent urethral discharge. Urethral smear showed intracellular gonococci ++. Per rectum the prostate felt prominent and symmetrical, with well-marked interlobar cleft. Harder than normal. On the 30th penicillin started—three-hourly intramuscular injections of 50,000 Oxford units to a total of 250,000 units. On the 31st slight purulent urethral discharge. Urethral smear showed pus and small epithelial cells and mucus only. Very scanty secondary organisms. He was given pot. cit. 15 gr. (1 g.) three-hourly in water. On Aug 3 there was a viscous opalescent urethral discharge. Two-glass test showed: 1st, opalescent with mucus, with threads and debris ++ ; 2nd, faintly opalescent with mucus. He was kept on pot. cit. three-hourly. On the 7th he showed slight milky mucopurulent urethral discharge. Early-morning two-glass test: 1st, opalescent with mucus and coarse sinking debris ++ ; 2nd, opalescent with mucus. Early-morning specimen showed pus cells and mucus only. He was then put on daily posterior irrigations with 1 in 10,000 mercury oxycyanide solution at a temperature of 120° F. (49° C.) in the irrigation can. On the 11th there was a slight viscous mucopurulent urethral discharge. Early-morning two-glass test showed : 1st, opalescent with mucus and coarse sinking debris + ; 2nd, opalescent with mucus. Per rectum, prostate prominent and turgid ; no induration or nodularity. Prostate was massaged, and prostatic smear showed pus cells +++. He was kept on daily irrigations. On the 17th his urethra was dry. Early-morning two-glass test showed: 1st, faintly opalescent with mucus and coarse sinking debris + ; 2nd, faintly opalescent with mucus. Prostate was again massaged, and he was discharged from hospital with instructions to report weekly for prostatic massage.

Discussion

Such cases are so common in tropical V.D. practice that it is a wonder they have not been commented on before now. The clinical findings are above suspicion when taken in the aggregate. I have already mentioned the unreliability of digital examination alone in assessing the condition of the prostate in early cases. However, when physical signs are present in the prostate they are as definite and conclusive of disease as any time-honoured physical signs in medicine. However, the microscopical evidence of prostatitis associated with venereally contracted urethritis, past and present, is irrefutable. I have mentioned cases in which palpably pathological prostates yield negative prostatic

smears, although this is the exception rather than the rule. It is observed invariably in those cases in which the prostate is of tough, rubbery consistence. This effect may be connected with the incomplete emptying of the gland, caused by the rigidity of the prostatic stroma, for often in such cases great pressure must be exerted on the prostate before prostatic fluid appears at the meatus. It may also be due to inflammatory exudate in the stroma causing occlusion of part or parts of the prostatic tree.

The fact that the structural changes in the prostate are found, and pus is seen microscopically in the fluid expressed, at the very first massage precludes the possibility of the prostatitis being traumatic in origin. Much more ambiguous and inconclusive are the bacteriological findings, both microscopical and cultural, in this condition. I have already referred to the rarity with which organisms of any kind are detected microscopically in such pathological prostatic smears; and this seems to coincide, so far as can be judged from so small a number of investigations, with the results of culture. In the eight cases in which Dr. Dowdeswell cultured the prostatic fluid no gonococci were grown. The secondary organisms may have been contaminants.

As regards the duration of the condition, I can speak with some authority, as in Mauritius for two whole years (1943 ahd 1944) I had the opportunity of observing the clinical progress of these cases. Defaulting was rare, and the patients reported weekly with clockwork regularity for prostatic massage; they came with a full bladder and their urine was inspected. The prostate was then massaged with a view to draining it, and prostatic smears were examined week by week. The results of the urine test and prostatic smear were recorded in each case. I use an arbitrary scale of my own to record the number of pus cells (polymorphonuclear leucocytes) in each prostatic smear as a whole (that is, not in any one field alone), ranging from + to + + + +, so that I can record the progress from week to week.

All cases of moderate severity—those in which the prostate is not very hard, shrunken, and nodular—respond to treatment, albeit slowly. The average period required to restore such pathological prostates to normal is between two and four months. The diminution of pus cells in the prostatic fluid is extremely slow, and is not appreciable until after the seventh or eighth week, and occurs *pari passu* with the softening of the gland. The urine, however, becomes clear long before the prostatitis resolves, and all urethral discharge disappears. The condition may be regarded as cured after three consecutive negative prostatic smears.

Aetiology

I have no theory to advance in explanation of this condition. Certain facts, however, are known from which certain conclusions can be drawn. The cases that I have quoted demonstrate clearly that it occurs very early in the course of primary acute gonorrhoea. It is only recently that I have adopted the practice of examining the prostate per rectum before starting treatment. In the past I have invariably been presented with a *fait accompli*—a diseased prostate the origin of which was open to conjecture. Furthermore, it may appear clinically either before treatment is begun or shortly after treatment, when the gonococcus is to all intents and purposes destroyed. It is much more common than folliculitis, which occurs characteristically in untreated cases of gonorrhoea of at least three weeks' duration; or in inadequately treated cases, as with small infrequent doses of a sulphonamide. In urethritis due to chronic anterior folliculitis or littritis the urethral discharge is usually teeming with mixed organisms, and urethral smears show myriads of secondary organisms—usually small Gram-negative bacilli—even though there may be relatively few pus cells. Occasionally also in chronic anterior folliculitis large clumps of gonococci may be seen lying close to or upon squamous epithelial cells. Such a picture never occurs in the urethral discharge associated with the prostatitis under consideration.

This early involvement of the prostate suggests that the prostatitis in question might be a purely secondary effect. The question is, Of what nature? If it be of an allergic nature, one would expect the whole of the genital tract to participate in the phenomenon. Further, if it be allergic, it is selective, not only as regards the prostate as a whole, but actually within the prostate, for it very often happens that one prostatic lobe is enlarged and tense while the other is normal in size and consistence. The same argument applies to a purely "toxic" theory. Again, a prostatitis of this nature responds, both when treated and when untreated, like any other closed infection elsewhere: when regularly drained it resolves; when untreated it leads to fibrosis. Furthermore, the severity of this type of prostatitis is definitely related to the stage at which treatment of the primary infection is begun and to previous infection. It is, indeed, to be expected theoretically, and is found in practice, much more often in cases which give a history of repeated infections, and in delayed or inadequate treatment. Again, epididymitis occurring in association with a urethritis of venereal origin is invariably preceded by a prostatitis, and gives rise to very acute symptoms, whereas the concomitant and antecedent prostatitis does not. If the prostate is palpated per rectum in cases of epididymitis, it is usually found that the prostatic lobe corresponding to the side of the affected testis is more abnormal than its fellow on the unaffected side; and prostatic smears obtained after the acute symptoms and signs of the epididymitis have subsided reveal pus cells in large numbers. Lastly, cases of prostatitis do occur in which gonoccoci are present in sufficiently large numbers to be detected microscopically in prostatic smears, although the history and physical signs in such cases should lead one to suspect the presence of gonococci in the prostate.

The sum total of clinical evidence, therefore, seems to indicate that the prostatitis under consideration is a true infection, due to invasion of the gland by gonococci or other organisms, or both. If that conclusion be the correct one, the following questions immediately suggest themselves: (1) Why does the posterior urethra become infected simultaneously with the anterior urethra in some cases of acute primary gonorrhoea at its very inception? (2) In those cases in which the prostate becomes infected subsequently to the administration of penicillin, why should a few gonococci survive the general and rapid destruction of the organisms which occurs, and invade the depths of the prostate, leaving the anterior urethra without evidence of infection? (3) Why is the gonococcus so difficult to recover from the prostate in cases of this kind?

Summary and Conclusion

The main object of this article is to stress the prevalence of symptomless subacute and chronic prostatitis discovered in the Tropics following routine treatment of acute gonorrhoea with penicillin (or the sulphonamides), in doses generally accepted as adequate, after the acute signs and symptoms of the disease have subsided. It embodies the practical experience of 4½ years' continuous V.D. practice in the Army.

Six cases have been chosen to illustrate the main features of the condition, and to prove that it can and does originate very early in the course of acute primary gonococcal infections, appearing sometimes before, and sometimes very soon after, apparently successful penicillin therapy.

The type of prostatitis encountered is described in detail, and its aetiology is discussed. No theory of its causation is advanced. Further careful and more comprehensive investigations, with the use of controls, will have to be undertaken before the problem is finally solved and a more efficient and rapid form of treatment of the condition is evolved.

I am indebted to Dr. R. M. Dowdeswell for his kind help and voluntary co-operation in what promised to be a very interesting series of investigations (I was posted outside the Command before they had progressed very far); and to Lieut. E. S. Machell, R.A.M.C., for helpful criticism and suggestions. I also wish to thank Brig. G. M. Denning, one-time D.M.S., East Africa Command, for permission to publish this article, which has been abridged from the original written at No. 87 (Nairobi) British Military Hospital in June, 1946.

THIOPENTONE–NITROUS-OXIDE–OXYGEN ANAESTHESIA WITH CURARE FOR HEAD AND NECK SURGERY

BY

J. G. BOURNE, M.A., M.B., D.A.

Honorary Anaesthetist to St. Thomas's Hospital

My purpose here is to describe a way of using thiopentone ("pentothal")–gas–oxygen anaesthesia to cover the whole field of surgery of the head and neck, including ear, nose, and throat, in adult patients. The method employs curare, the passing of endotracheal tubes, and the performance of artificial respiration in patients who may be apnoeic for many minutes. The article is therefore intended only for specialists in anaesthetics who are familiar with these techniques and not for the "occasional anaesthetist," who is recommended to continue to use the better-known methods with ether.

Many anaesthetists now agree in placing thiopentone–gas–oxygen, where their use is applicable, in merit above all other agents for speed of induction, ease and safety in maintaining anaesthesia, and freedom from unpleasant sequelae. Used together, they provide light general anaesthesia suitable for surgery of skin, fascia, muscle, bone, joint, and nerve—suitable, in fact, for all operations on the limbs and the body wall. They would also cover operations in the ear, nose, and throat, on the face, scalp, and neck, and on the skull and its contents, were it not for the difficulties of intubating, packing the pharynx, and deadening the cough reflex when they alone are used.

To overcome these difficulties the common practice has been to deepen the anaesthesia with ether until the jaw and larynx are relaxed for intubating and then to continue anaesthesia with ether at a level where the cough reflex is deadened, aided perhaps by spraying the larynx with cocaine. The objections to this are threefold: (1) It is time-consuming: 15 minutes or more are usually needed to provide conditions for easy atraumatic intubation through the mouth, and attempts to intubate earlier often result in greater delay. (2) An ether anaesthesia of this depth is nearly always followed by nausea and malaise of considerable duration. (3) Under certain conditions there is a risk of explosion.

It was to eliminate these disadvantages and to gain those of the thiopentone–gas–oxygen combination that the method to be described was evolved. In this method curare replaces ether as the relaxing agent: The profound relaxation which it provides is quick and certain. The larynx and trachea can be very thoroughly "cocainized" by spraying, so that the cough reflex remains deadened, and intubating and pharyngeal packing are easy. The time taken is greatly reduced, the patient is spared the unpleasant after-effects of ether, and no inflammable agent is used.

Method

In outline the sequence is as follows: (*a*) Initial injection of thiopentone, injection of curare, injection of maintenance dose of thiopentone. (*b*) Insufflation of the lungs with oxygen, using the Boyle's machine and mask, for two to three minutes until the full curare effect has developed. (*c*) Laryngoscopy, "cocainization," intubation. (*d*) The machine is now connected to the tube and the gas–oxygen flow started. The larynx is packed and gas–oxygen anaesthesia continued with "assisted" respiration until spontaneous respiration has recovered to a normal depth.

Consider these points in detail. The initial dose of thiopentone varies according to the principles well understood by anaesthetists, but should be on the generous side. For a robust young adult it is 12 to 14 ml. of 5% solution. The dose of curare is 20 mg. of pure crystalline *d*-tubocurarine chloride made up in 1% solution and called "tubarine" (Burroughs Wellcome). This is given quickly in one injection immediately after the thiopentone, and as the solutions of thiopentone and curare are incompatible it is better injected through another needle into a different vein.

At first smaller doses of curare were used and found insufficient in some cases where intubating through the mouth was necessary. But if intubating through the nose is required for an operation of short duration—as, for example, dissection of the tonsils by a quick surgeon—the smaller dose of 15 mg. is preferable. Unlike thiopentone, it is difficult to predict the approximate dose of curare that is required for any individual. What is important is that it should be sufficient. With a relative overdose, artificial respiration is, by the very nature of the action of curare, extremely easy to perform. With too small a dose intubation is difficult and the merits of the method are largely lost.

The maintenance dose of thiopentone is for the purpose of providing continual basal narcosis throughout the operation. What remains in the 20-ml. syringe is usually enough. It may be given immediately after the curare or intermittently over the next few minutes according to the reaction of the patient to the initial dose. In robust young patients the whole dose is generally given at once. If the operation is a long one, further small doses of thiopentone may be added from time to time when necessary, the ankle veins being chosen as conveniently remote from the surgical field.

Insufflation of the lungs with oxygen is most simply done by holding the mask firmly on the face, turning on the oxygen bypass, and alternately squeezing the bag to inflate the lungs and lifting the mask a little to allow the expired gases to escape. This is continued for two or three minutes, when the full effect of the curare will have developed. At this stage apnoea is complete, or nearly so, but the concentration and quantity of oxygen in the lungs is high enough to provide full oxygenation of the blood, under the conditions, for many minutes.

During these minutes laryngoscopy, "cocainization," and intubation are performed with care, with ease, and without hurry. There is inevitably some accumulation of carbon dioxide. It is likely that this develops slowly, as not only is the metabolism of the patient depressed by the premedication (omnopon 1/6 gr.=11 mg.; scopolamine 1/150 gr.=0.45 mg.) and by the thiopentone but also muscle tone is abolished by the curare. In any case it is a common practice for the anaesthetist deliberately to raise the concentration of alveolar CO_2 in the early stages of an anaesthetic without apparent detriment to the patient.

"Cocainization" is performed by spraying the larynx, under direct vision, with the usual type of Rogers spray. The exposure is so good that there is no difficulty in directing a cloud of fine spray not only over the larynx but down the trachea. If the operation is a long one, 2% amethocaine is used liberally, but for a short operation, especially one in which blood may accumulate in the pharynx when it is finished, 10% cocaine solution is used, and sparingly.

Oral is preferred to nasal intubation whenever the surgical procedure allows, and the largest tube which will pass com-

fortably through the larynx is chosen. This is encased in a special armouring, described below. It prevents kinking, acts as a mouth-prop, and is firmly tethered by a tape tied round the neck. The wide-bore airway thus assured is desirable in all cases, and is essential to intracranial operations.

Directly the tube is in position it is connected to the machine and the flow of gas and of oxygen started. The flow-rate of gas is standard for all cases at 6 litres per minute. The flow-rate of oxygen is 2 litres per minute (giving a concentration of 25%) until spontaneous respiration has recovered to a normal depth, when it is reduced to 1½ litres per minute (giving a concentration of 20%). In the early stages it is seen from the movements of the bag on the machine that spontaneous respiration is inadequate. This is easily dealt with. The pressure on the expiratory valve is increased until, when the bag is compressed manually, the chest is seen to expand. Rhythmical manual compression of the bag is continued thus so long as it is necessary to assist respiration. This is rarely more than 10 minutes, often less than 5; occasionally compression is not necessary at all.

That the above method of dealing with the respiratory weakness is effective is shown, first, by the complete absence of cyanosis in all patients, and, secondly, by the fact that if it is performed vigorously the CO_2 concentration can be so lowered that temporary apnoea results.

Apparatus

1. The ordinary Boyle's machine with standard Magill's attachment consisting of bag, tubing, expiratory valve, and face-mask.

2. Magill's endotracheal tubes, connexions, and catheter mount.

3. A flexible metal tube with bell-shaped mouthpiece (Fig. 1). This is made by Medical and Industrial Equipment, Ltd., in two

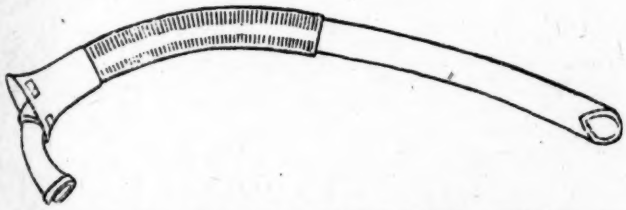

Fig. 1.—A flexible metal tube with bell-shaped mouthpiece, for use with Magill's tubes.

sizes: a No. 10, which is suitable for use with Magill's tubes of size 10, 9, and 8; and a No. 8 for Magill's tubes size 8, 7, and 6. This device effectively prevents the tubes from kinking even when they are softened by repeated boiling, which is the most satisfactory way to sterilize them. It encases the Magill's tube only as far as the base of the tongue, and has four holes near its mouth-end, through which tape is threaded and tied firmly round the neck (Fig. 2). It has been in use for many months and has proved entirely satisfactory.

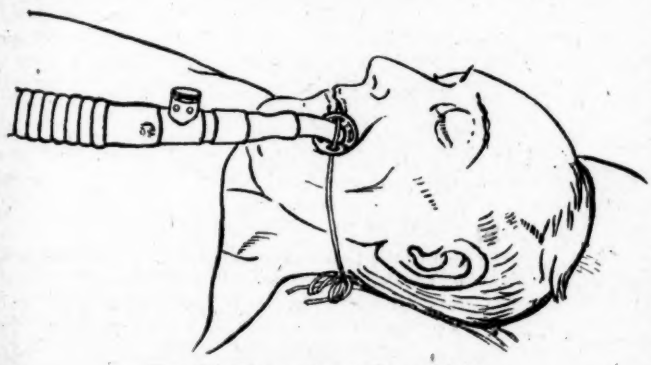

Fig. 2.—The apparatus in position.

4. The Macintosh laryngoscope is preferred to other models. It sometimes happens that the Magill's tube is deflected towards the oesophagus at a tangent to its curved blade. To overcome this little difficulty various types of simple introducers have been used to direct the tip of the tube into the glottis.

Discussion

The merits of the method described are its speed, simplicity, and freedom from hurry; the absence of complicated apparatus and of bulky appliances near the operating field; the good relaxation; the absence of risk of explosion; and the rapidity of recovery and freedom from unpleasant symptoms.

It may be thought that there is danger in the immediate post-operative period of aspirating blood or other material owing to residual weakness from the curare and to insensitivity of the upper air-passages from the "cocainization." In practice it is generally found that both the cough reflex and the power to cough have returned by the end of the operation. The patient, however, is turned semi-prone with the head low to lessen this risk when it is present.

The surgeons on whose cases this method has been used have not reported any increased tendency to bleeding. The table is tilted 10 degrees, head up, to diminish bleeding whenever the operation allows.

Other agents are in use for procuring the initial relaxation for intubating. By some, thiopentone is used alone, while others add cyclopropane. But in my opinion there is no agent which is so quick, so certain, and so safe as curare.

Medical Memoranda

Bilateral Abductor Laryngeal Palsy in Syringomyelia

The under-noted case is worthy of record because it demonstrates the importance of laryngological examination in cases of nervous disease even when there is no disturbance of voice and involvement of the larynx is unsuspected.

Record of Case

A chaplain, aged 33, had for about seven years been aware of sensory disturbances in the hands and left leg. He noticed that when taking a hot bath the heat was not appreciated by the affected parts although temperature sensation was normal elsewhere. He paid little attention to these symptoms.

About three months previous to his present admission to hospital he had felt ill with headache and general malaise. Thinking that he had influenza, he reported to his doctor, who found that he had a temperature of 101°F. (38.3° C.), but no abnormality in throat or chest. It was then discovered that there was a large area of cellulitis over the posterior aspect of the right elbow. In a normal person this would have caused considerable pain, but, apart from the fever, the patient was unaware of its presence.

Neurological examination showed that the left leg was stiff on walking. There was marked muscular wasting of the left hand, and the grip was weak. The left eye had a small pupil and narrowed palpebral fissure (Horner's syndrome). Sensation for touch was diminished on both sides of the face and over the right side of the trunk. Appreciation of painful stimuli and of heat was lost over the chest, both arms, left side of the abdomen, and left leg. Knee- and ankle-jerks were more pronounced on the right side than on the left. Abdominal reflexes were present on both sides. An extensor plantar response was elicited on the left side. A diagnosis of syringomyelia was made.

The patient attended for rhinological examination on account of nasal obstruction and catarrh. One year previously the septum had been resected with improvement in nasal patency but little effect on the discharge. He had no complaint with regard to his voice, which in the exercise of his calling was of paramount importance to him. During the past month, however, he had noticed a tendency to become breathless on exertion.

Examination revealed a chronic infection of the right maxillary antrum, with pus in the middle meatus. There was pus in the right choana, and the posterior edge of the septum was markedly swollen. Palatal, pharyngeal, and lingual movements were normal. There was some diminution in sensation in the pharynx, but no

actual anaesthesia. Laryngoscopy showed the presence of bilateral abductor palsy. The cords, which were normal in appearance, approximated perfectly on phonation. On inspiration they barely separated, leaving a glottic chink surprisingly small to cause such slight symptoms. Deep inspiration, instead of widening the glottis, seemed rather to narrow it by sucking the cords downwards.

Comment

The occurrence of bilateral abductor palsy in syringomyelia receives but scant attention in the textbooks. The fact that laryngeal palsies are caused by this condition is mentioned, but no details are given. It is evident, however, that the presence of a bilateral abductor palsy affects the prognosis in this particular case to a considerable extent. Not only does it show that the disease has extended to the bulb (syringobulbia) but there is now liability to sudden severe dyspnoea, which might demand tracheotomy.

The chronic nasal sinusitis predisposes to attacks of laryngitis with consequent narrowing of an already dangerously obstructed glottis, and the performance of tracheotomy as a precautionary measure must be seriously considered.

Glasgow. D. Brown Kelly, M.D., D.L.O.

Hypertrophia Musculorum Vera

In view of the rarity of the adult type of paradoxical muscular hypertrophy it was felt that the following case might be worthy of record.

Case History

The patient, a youth of 19, joined a Naval training establishment in February, 1946, for the first stages of ordinary seaman's training. He first reported sick two weeks later, complaining of cramp-like pains and weakness in the muscles of the legs and thighs. These symptoms were brought on by exercise such as physical training and marching "at the double"; cramps occurred very occasionally at rest, but were always of slight severity. At first the symptoms were ascribed to the over-use of unaccustomed muscles—a not infrequent cause of muscular aches and pains in the early weeks of training. The patient persisted with his complaints, however, and was admitted to sick quarters for investigation.

On admission he gave a history of acute nephritis four years previously; there were no other illnesses. Shortly after his recovery from the nephritis he noticed pains and weaknesses in both legs, which limited the distance he could walk with comfort. At school his athletic performance was average and he achieved some notoriety by reason of his physical strength. He had had several jobs, first as a labourer, and stated that more recently he had sought lighter occupations because of his disinclination for heavy or prolonged work. He gave a family history of the death of his father and three paternal uncles before the age of 30, but unfortunately no details whatever of these cases could be obtained.

On examination he was found to be a healthy-looking youth of rather stout build and showed no abnormality of the cardiovascular or respiratory systems. Kidney function was normal. There were no abnormal signs in the nervous system, all reflexes being present, movements well co-ordinated, and all forms of sensation unimpaired. No fibrillary twitching was observed. There was marked bilateral hypertrophy of the muscles of the calves, quadriceps femoris group, glutei, and forearms. The muscles were firmer than normal in the relaxed condition, and hard on voluntary contraction. Power did not appear to be greatly lacking, though it was less than the general development would have led one to expect. Various laboratory investigations were carried out, but the only abnormal finding was creatinuria to the extent of 1.04 g. in a 24-hour specimen.

Comment

This seems to be a case of hypertrophia musculorum vera. It is a very rare condition which occurs mostly in adult males, and shows muscle hypertrophy of a varying distribution, usually without perceptible nerve lesions. It differs from the commoner pseudo-hypertrophic type in having a later age incidence and also in showing an early stage of true hypertrophy with subsequent loss of power as in Spiller's (1913) cases. It was unfortunate that no detailed family history could be obtained. In Barnes's (1932) detailed report of a myopathic family there were many cases of a similar type; he found the age of onset to be mainly in the 35–40-year group, but there was a late juvenile onset in a few instances. The above case appears to be in the early stages of loss of muscle power. The condition is slowly progressive, and finally shows heroic muscular development with paradoxically reduced contractile power and fatigue endurance.

Creatine is excreted normally in the urine of infants and children of both sexes up to the age of puberty. It occurs intermittently in the urine of women, and continuously through pregnancy and the period of involution. It is absent from adult male urine except for occasional traces. Creatinuria may occur in the myopathies and in conditions of unusual breakdown of muscle tissue or increased general metabolism—for example, starvation, diabetes, exophthalmic goitre, and fever.

I am indebted to Surg. Capt. J. G. Boal, R.N., medical officer in charge of a Royal Naval sick quarters, for permission to publish this case, and to Dr. Macdonald Critchley, consultant in neurology to the Royal Navy, for his advice.

Ian L. Maxwell, M.B., B.Ch.,
Late Surgeon Lieutenant, R.N.V.R.

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Invaginated Meckel's Diverticulum containing a Tumour, with Associated Intussusception

New growth arising in a Meckel's diverticulum is a great rarity (Edwards, 1939) and intussusception due to invagination of a Meckel's diverticulum is an infrequent occurrence. Harkins (1933) was able to find 49 recorded cases of tumours of Meckel's diverticulum, and in a survey of 114 cases of intussusception due to invagination of the diverticulum he found a tumour present in 26. Milroy Paul (1939), recording a case, quoted 15 additional cases of invagination with intussusception, but in his case there was no tumour and he did not mention a tumour as being present in the other 15 cases. It therefore seems worth while putting on record the following case of an invaginated diverticulum containing a tumour and causing intussusception.

Case Report

An apprentice carpenter aged 16 was admitted to Llandough Hospital on March 28, 1945. He gave a history of colicky abdominal pain with attacks of vomiting over a period of about 26 hours. The bowels had been opened the day before admission, but no blood had been passed per rectum. His general condition was good, with the temperature 99.6° F. (37.55° C.) and the pulse rate 96. A small tender mass was palpable in the right iliac fossa and there was tenderness on the right side on rectal examination.

Operation was performed an hour after admission, the abdomen being opened through a McBurney incision. Free clear yellowish fluid was present in the peritoneal cavity. A mass presented in the incision and on delivery proved to be a loop of intussuscepted ileum. The intussusception, which was about 1 ft. (30 cm.) in length, was easily reduced by the usual technique, but it was then found that the apex of the intussusception had been occupied by an inverted Meckel's diverticulum. Reduction of the latter was difficult, but it was eventually accomplished. The diverticulum was found to be about 2 in. (5 cm.) in length, and at its apex was a firm mass about the size of a hazel-nut. Diverticulectomy was performed and was followed by appendicectomy and closure of the abdomen. Convalescence was uneventful, and the patient was discharged from hospital 12 days later.

Microscopical examination showed that the mass in the diverticulum had the appearance of a submucous lipoma, some parts of the covering epithelium having desquamated.

I wish to express my thanks to Dr. A. E. Carragher for examining the excised specimen.

D. B. E. Foster, M.B., F.R.C.S.Ed.,
Resident Surgeon, Llandough Hospital, Cardiff.

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The increasing number of women pharmacists was referred to at a dinner given by the National Association of Women Pharmacists in honour of the election of Mrs. J. K. Irvine, M.B.E., as first woman president of the Pharmaceutical Society of Great Britain. Mrs. Irvine said she had met women pharmacists from ten countries, including Turkey, Palestine, and Iran, at the recent meeting of the International Pharmaceutical Federation in Zurich. Mr. H. C. Shaw, the Society's vice-president, added that in the next generation we should probably have more women pharmacists than men. He asked them therefore to take a long-range view so that the next generation of pharmacy would be better than ours.

Reviews

NEW ASPECTS OF PSYCHIATRY

Dimensions of Personality. By H. J. Eysenck, Ph.D. With foreword by Prof. Aubrey Lewis, M.D., F.R.C.P. (Pp. 308. 25s.) London: Kegan Paul, Trench, Trubner and Co. 1947.

This book contains an account of a great deal of work done by Dr. Eysenck and his collaborators in the Psychological Department at the Maudsley Hospital. Much of it was stimulated by the problems of the neurotic soldier, which predominated in wartime psychiatry. Nevertheless the chief importance of the book does not lie so much in the actual results of the investigations carried out, impressive though they are, as in the fact that we read of the fruitful introduction of new research methods into psychiatry. When two sciences which have long remained mutually isolated at last begin to influence one another, we frequently see a rapid advance owing to the methods evolved in the one field being applied to the material found in the other. This book describes such an event. The methods familiar to psychologists, which were making only slow progress in inquiries directed to normal individuals, were found to be remarkably appropriate when applied to groups of individuals who could be distinguished from one another by the success or failure of their response to actual stresses of life. The results compel us to re-examine our ideas. The basic concepts of psychiatry are largely nosological in character. "Neurosis" and "psychopathic personality," vague though these terms are, have for the psychiatrist been imbued too much with the meaning of illness. The psychological approach has focused attention on the underlying qualities of temperament, which provide the disposition to neurotic breakdown or psychopathic reaction.

The title of the book epitomizes the new viewpoint. The author teaches us to look on human beings as varying in a great number of characteristics between opposite poles of the smooth and continuous "normal curve." Differences between individuals are quantitative only, may be small or large, and are measurable. The old theories of "types," such as the "introvert" and the "extravert," have to be discarded, and the types themselves are seen as merely the extremes of the curve of distribution in respect of some one quality. The results of investigating the character of suggestibility provide an elegant and convincing illustration. Psychiatrists have identified suggestibility with hypnotizability and with the syndrome of hysteria. Patients either are or are not hysterics. Preliminary psychological investigation seemed to reveal that there was a fairly sharp cleavage between the suggestible and the non-suggestible, but further inquiry has shown this to be a statistical and experimental artefact. Most people are moderately suggestible, but they vary evenly towards the two poles. Evidence which confirms and justifies this revolution of old and accepted ideas can be drawn both from psychological experiments and from advances in clinical psychiatry during the war, and even from our knowledge of genetics. One consequence of this work will be that our textbooks of psychiatry will have to be largely rewritten.

ELIOT SLATER.

COLOUR VISION

Sensory Mechanisms of the Retina. With an Appendix on Electroretinography. By Ragnar Granit, M.D. (Pp. 412; illustrated. 35s.) London: Geoffrey Cumberlege (Oxford University Press). 1947.

The study of the sensory mechanisms of vision has in the past largely depended on the interpretation of subjective phenomena. Some investigators have been at pains to attempt objective investigations, but many have been content to record their sensations qualitatively. Prof. Granit saw that more progress was likely if the subject was attacked quantitatively and objectively.

He describes in this book his investigations and relates his results to those of other workers. The first two sections form an introduction, and he discusses the results achieved by electroretinography. In Section III, which is a necessary introduction to the following section, he considers the properties of the photosensitive substances in the retina, and then in Section IV gives a detailed account of retinal colour receptors and how he was led to discover them. The technique which he has perfected is a great advance on the single-fibre preparation in the optic nerve and enables him to study the responses of single light-sensitive units, or small groups of them, which may transmit impulses through a single nerve fibre. The nature of the experimental technique is such that the reader may wonder what has led Granit to believe that he is dealing, in a particular experiment, say, with a single light-sensitive element, or, again, in what proportion of trials a definite result is obtained. The author answers these and similar questions clearly and in a manner revealing the difficulties involved rather than merely stating the results achieved. The section on technique enables one to form an opinion of his results and instils a feeling of confidence in Granit's dominator-modulator theory and the manner in which this may be used to explain "colour vision."

The book should appeal to a variety of readers. To the worker interested in this rapidly expanding branch of physiology it provides a clear account of the results achieved. The advanced student will be interested in its account of electrophysiological methods for elucidating the mechanism of sensation. The general reader will learn of modern concepts in colour vision from chapters which do not presuppose a deep knowledge of physiology. So far, the observations on colour receptors have been made only on animals, but recent work on man by other investigators using less objective methods of experimentation suggests that modulators may exist in the human retina.

J. L. D'SILVA.

ADVANCES IN PHYSIOLOGY

Annual Review of Physiology. Volume IX. Editor, Victor E. Hall; Associate Editors, Jefferson M. Crimson and Arthur C. Giese. (Pp. 736. $6.00 or 36s.) California: Annual Reviews Inc., and American Physiological Society. London: H. K. Lewis and Co. 1947.

The demand for annual reviews of advances in particular subjects is indicated in the preface of this volume by the announcement that a series on microbiology is to be produced. But despite the possible deviation of material and extensive cutting by the editors this volume is appreciably larger than the last, partly because papers which could not be printed during the war owing to difficulties of circulation or secrecy regulations are now available. It is almost inevitable that the articles should be of unequal merit, for authors differ in their ability to take up definite standpoints from which to survey their material, and the quality and scope of the work reviewed vary. However, this volume attains the standard of its predecessors, and for the first time since the series started it has been possible to include a significant number of articles from European authors, who give excellent reviews, as opposed to catalogues, of the subjects entrusted to them.

The book follows its usual lines and in twenty-seven articles (as against twenty-five last year) includes topics which have not been reviewed previously or for a long time—"Growth," "Physiology of Supporting Tissue," "Bioelectric Potentials in the Nervous System and in Muscle," "Defence Mechanisms"—but the majority of the articles cover a one- or two-year period to the middle of 1946. Apart from the physiologist who wishes to be sufficiently acquainted with new work to keep his subject in perspective the clinician will find much to direct him to new approaches to his problems. For instance, in the section entitled "Digestive System" H. Greengard discusses at length the aetiology and treatment of peptic ulcer, and the effects of nerve section are discussed in another article. Current opinion on the estimation of renal activity by the method of clearances is surveyed under "Kidney," and the connexion between the kidney and arterial hypertension is discussed in this and other sections. C. J. Wiggers in a comprehensive review of the peripheral circulation urges cautious appraisal of circulatory measurements made by new techniques such as atrial catheterization and discusses the haemodynamics of shock, the calculation of peripheral resistance, and the mechanism of hypertension, though a misprint occurs in the formula for calculating peripheral resistance.

It is impossible to do more than indicate some of the topics which have attracted the personal interest of the reviewer, such as the further application of electronic methods in the exploration of physiological and clinical problems as indicated by the articles on "Bioelectric Potentials" and "Electrical Activity of the Brain." W. R. Ingram and F. K. Sanders respectively discuss some of the functions of afferent nerves, both visceral and somatic, the latter author recording the latest views on hyperalgesia, causalgia, and phantom limb. D. J. Mulford describes notable advances, arising from researches intensified during the war, in our knowledge of the protein components of the blood plasma and their potential uses. An extensive review, "Muscle," considers the relationship between molecular structure and the contractile process, and mention is made of neuromuscular transmission and the possible nature of the breakdown in myasthenia.

A. Hemingway.

THE THYROID GLAND

A Tiróide. Fisio-patologia. Diagnóstico e tratamento de suas enfermidades. By Hilio de Lacerda. Endocrinologia Elementar. Volume I. (Pp. 152; illustrated. No price given.) Brazil: Sao Paulo (Rua Rego Freitas, 490). 1946.

Those wishing to revise their knowledge of the thyroid without reading the late Mr. Cecil Joll's *magnum opus* should find this admirable little monograph useful. The author intends to produce similar volumes on the other endocrine glands. Prof. de Lacerda's conception of the "thyroidon," by analogy with the nephron and the hepaton, assists in the understanding of the normal gland, whose embryology, anatomy, and physiology he discusses in the early chapters. He then considers the pathology of the thyroid and the treatment of its diseases. It is refreshing to see adequate mention of Hashimoto's disease in such a small book, a subject completely ignored by some standard textbooks of pathology.

Perhaps of special interest to British readers will be the chapter summarizing the views of the Soviet worker Kazakov on the treatment of hyperthyroidism with hydrolysates of liver, spleen, muscle, parathyroid, pancreas, etc. Kazakov maintains that the phenomena of hyperthyroidism are those of a generalized acidosis, and that the greater incidence of the condition in the female can be explained by disturbances of the acid–base equilibrium to which that sex is subject in the premenstrual period, in menstruation, in pregnancy, and at the menopause. Kazakov summarizes the aetiology of the "functional" diseases of the thyroid thus: (*a*) Simple hyperthyroidism without glandular enlargement, due to increased production and reabsorption of colloid without an associated storage of excess. (*b*) Graves' disease, where there is not only increased reabsorption of colloid, but also its more rapid accumulation in the distended follicles of the gland. (*c*) In simple goitre the gland increases in size on account of lessened reabsorption of the qualitatively altered colloid and increased reserves due to breakdown of the epithelial function. (*d*) In myxoedema the colloid coagulates in the follicles and appears to lose the capacity for being reabsorbed via the blood stream. The epithelium therefore degenerates.

One misses any reference to the use of radio-iodine in research into thyroid function, but there is a chapter on thiouracil therapy. Each chapter has a good list of references to the literature in five languages. Unfortunately the volume is very lightly bound, and there are many small typographical errors. The illustrations are adequate.

J. C. Ford.

The arrangement and style of the second edition of Wilfred Shaw's *Textbook of Midwifery* (J. and A. Churchill: 21s.) remain unchanged, but the author has added about sixty pages in expanding some sections and included new material on chemotherapy and haemolytic disease of the foetus and newborn. It remains a book difficult to appraise, for it contains a number of doctrines that have been largely disproved, some that have been approved only to a limited extent, as well as individual views of the author which command respect if not acceptance. The author discusses the details of treatment well, and the illustrations are good. Although some parts of the book will interest those who have a knowledge of midwifery, its lack of balance may detract from its suitability as a textbook for undergraduates.

BOOKS RECEIVED

[Review is not precluded by notice here of books recently received]

The Psychoanalytic Study of the Child. Vol. II 1946. Edited by Anna Freud, Heinz Hartmann, M.D., *et al.* (Pp. 424. 30s.) London: Imago Publishing Co.

In five sections: Problems of Child Development, Clinical Problems, Guidance Work, Problems of Education and Sociology, History of Child Psychiatry.

Materia Medica for Nurses. By A. Muir Crawford, M.D., F.R.F.P.S.G. 6th ed. (Pp. 160. 5s. 6d.) London: H. K. Lewis. 1947.

A manual of materia medica intended for nurses; a new chapter on peniciliin included.

Diseases of the Chest. By E. H. Rubin, M.D., F.A.C.P., F.C.C.P., and M. Rubin, M.D. (Pp. 720. 60s.) Philadelphia and London: W. B. Saunders Company. 1947.

A general account of chest diseases with many illustrations, including a section on the principles of surgical treatment.

Estudios Sobre el Pulmon Colapsado. By Dr. Jose Abello Pascual. (Pp. 506. No price.) Madrid: Publicaciones del Patronato Nacional Antituberculoso. 1946.

A monograph on collapse of lung, with clinical and experimental details.

Penicillin Therapy. By J. R. Goyal. 2nd ed. revised. (Pp. 177. No price.) Delhi: Dr. J. R. Goyal, the Albion Press. 1947.

An account of penicillin and streptomycin; intended principally for the medical practitioner in India.

Old People's Welfare on Merseyside. By Ellinor I. Black and Doris B. Read. (Pp. 110. 2s. 6d.) The University Press of Liverpool. 1947.

An account of the welfare provisions for old people on Merseyside.

Advanced Industrial First-Aid. By R. A. Trevethick, M.B., Ch.B. (Pp. 63. No price.) Rotherham: Henry Garnett and Co. 1947.

A pocket manual of first aid in industry intended for the layman.

Science and Nutrition. By A. L. Bacharach, M.A., F.R.I.C. 3rd ed. (Pp. 142. 6s.) London: Watts and Co. 1947.

Recent knowledge on nutrition and dietetics described for the layman.

Child Psychology. By Arthur T. Jersild. Ph.D. 3rd ed. (Pp. 623. 30s.) London: Staples Press. 1947.

The author describes the development of the child's mind and its relation to his behaviour.

A Neuro-Vascular Syndrome Related to Vitamin Deficiency. By H. Smitskamp. (Pp. 114. No price.) Amsterdam: Scheltema and Holkema's Boekhandel. 1947.

A monograph on the "burning feet" syndrome.

Smoke: The Problem of Coal and the Atmosphere. By Arnold Marsh, M.Sc.Tech., M.Inst.F. (Pp. 306. 21s.) London: Faber and Faber. 1947.

An account of smoke from industrial and household chimneys and its relation to health, urban amenities, and fuel wastage.

Exposés Annuels de Biochimie Medicale. Edited by Michel Polonovski. (Pp. 285. 560 francs.) Paris: Masson et Cie. 1947.

Includes papers on the alkaloids of ergot, bacterial antigens, synthetic oestrogens, the biochemistry of cobalt, and the initial stage in the biogenesis of organic compounds.

Diseases of the Joints and Rheumatism. By Kenneth Stone, D.M., M.R.C.P. (Pp. 362. 30s.) London: William Heinemann. 1947.

An introduction to rheumatic and other joint diseases for medical students and postgraduates.

Visible Speech. By R. K. Potter, G. A. Kopp, and H C. Green (Pp. 441. 25s.) New York: D. Van Nostrand Company. 1947.

An account of speech sounds made visible by photographic recording: profusely illustrated.

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CHEMICAL CARCINOGENESIS

Percivall Pott began the story in the eighteenth century when he recognized that soot caused "chimney-sweeps' cancer." Clinical observation disclosed other occupational cancers attributable in the main to mineral oils and tars. In 1915 Yamagiwa and Ichikawa, in Japan, first produced cancer experimentally by painting rabbits' ears with coal tar. Soon afterwards Tsutsui extended the method to the skin of mice, with which most of the subsequent work has been done. Tar-painting yielded much valuable information about the induction of tumours, but most investigators attributed the carcinogenic power of tar to its capacity for producing "chronic irritation" of appropriate duration and intensity; only a few suspected that a specific carcinogenic constituent was present. The next big advance was made in 1932 at the Cancer Hospital in London when Kennaway and his collaborators, Cook, Hieger, and Mayneord, demonstrated the carcinogenic power of a pure substance of known chemical constitution, namely, 1:2:5:6-dibenzanthracene. The consequences were far-reaching. The use of constant pure chemicals in place of complex variable mixtures increased greatly the range and precision of experimental carcinogenesis, and, more important, chemical methods and modes of thought were henceforward increasingly assertive in cancer research. Many more carcinogenic hydrocarbons were identified, including 3:4-benzpyrene, the active constituent of tar, and 20-methylcholanthrene, a highly potent carcinogen closely related to the naturally occurring bile acids. Within the group of carcinogenic hydrocarbons there was close correlation between carcinogenic activity and chemical structure, so that the carcinogenic potency of previously unknown compounds could be predicted with remarkable accuracy. It was then a plausible hypothesis that all cancer was induced by carcinogenic hydrocarbons either introduced into the body as such or formed from normal body constituents in response to other known inciters of cancer, such as the radiations of radium, *x* rays, and ultra-violet light. The hypothesis in its simple form became untenable as a result of the almost alarming growth of the list of carcinogenic agents, which soon included chemical substances of the most diverse kinds. This list now includes the azo-dyes, of which "butter-yellow" is the most familiar; acetylaminofluorene, whose carcinogenic power was discovered accidentally while it was being examined as an insecticide; stilbene derivatives; and much simpler compounds such as urethane and carbon tetrachloride. The focus of interest is no longer the discovery of new carcinogens but the study of their mode of action.

Several papers in a recent issue of the *British Medical Bulletin* deal with this subject, and Prof. Alexander Haddow discusses the theoretical aspects in a paper which discloses the range and complexity of the investigations now being used in cancer research. Most medical readers may admit, without loss of face, that Prof. Haddow's erudition in chemistry, physics, and biology is beyond their reach. The enormous accumulation of uncoordinated information about cancer must be studied against a background of general biology which has vastly changed in methods and outlook during the past fifteen years. The symposium on chemical carcinogenesis by twenty contributors to the *Bulletin* is a valuable survey of modern knowledge. An introductory editorial, notable for its avoidance of the British vice of understatement, finds reason for a "hope that the daily flood of facts, which we do everything in our power to encourage, will become progressively less a mere burden to the mind and more a source of refreshment to the spirit!" Meanwhile, laymen and many doctors, excusably indifferent to the spiritual welfare of investigators, ask relentlessly: What is the cause of cancer? What are the prospects of finding a cure? The twenty contributors to the *Bulletin* cannot give a plain answer. Nor can anyone else. In truth the questions are not as plain as they seem. It is profitable to distinguish between the cause and cure of cancer in general and the aetiology and treatment of particular kinds of cancer. Most cancer research workers presume that some fundamental cell change is common to all kinds of cancer and is indeed the indispensable basis or "cause" of cancer. They disagree widely in describing this cause in terms of genes, plasmagenes, enzymes, or viruses. Knowledge of this fundamental cause may be a necessary condition for finding a true "cure" for cancer. In his admirable discussion of the chemotherapy of cancer, Prof. Haddow sets out the formidable difficulties: the host apparently exerts no protective action against its own tumour; a differential action on normal cells and their neoplastic variants is extremely difficult to achieve; and the malignant change seems to all intents and purposes permanent and irreversible. He believes that the most hopeful method of attack is the persistent investigation of the mode of action of carcinogens and that the problem of the reversal of the carcinogenic action is "very likely just soluble." This, of course, would constitute a true "cure" of cancer, but Prof. Haddow does not imply that it is within sight.

The problems of aetiology and treatment in particular kinds of cancer require a different approach. It is widely agreed that many and varied factors or inciting agents may contribute to the fundamental change which constitutes the proximate cause of cancer. These factors—"causes" in everyday usage—may be different or may operate in different combinations in the varied types of neoplastic disease. Their elucidation in human cancer may be long and tedious but is essential to rational prophylaxis. The aetiology of only a few kinds of cancer is reasonably clear; these include cancers due to radiations, the occupational cutaneous cancers induced by mineral oils and tars, and the "aniline cancers" of the bladder in dye-workers. The aetiology of most forms of human

cancer remains obscure. Dr. Hieger summarizes his own observations and those of others on the isolation of carcinogenic substances from human tissues, but interpretation of the results is difficult, for carcinogenic agents occur erratically in patients with cancer and in patients without cancer. The part played by hormones, genetic factors, and virus-like agents, demonstrably important in animals, awaits adequate investigation in man. The distinctive properties of different kinds of cancer have been emphasized during the past few years by the introduction of three new methods of treatment: castration and oestrogen therapy for cancer of the prostate; the chlorethylamines ("nitrogen mustards") for Hodgkin's disease and some other lymphadenopathies; and urethane for leukaemia. None of these is a cure for cancer; the action of each is usually temporary and is effective, it seems, on only one kind of tumour or on a few closely related kinds. These treatments, though limited in scope and effect, provide the best grounds for hopes of early improvements in cancer therapy, for, as Prof. Haddow emphasizes, they show that tumours are more susceptible to experimental interference than was thought likely less than ten years ago.

We may appropriately conclude with felicitations to the investigator whose name is permanently linked with "chemical carcinogenesis." Cancer research workers everywhere will unite in warm approbation of the recent bestowal of the honour of knighthood on Prof. E. L. Kennaway.

FAT ABSORPTION AND THE SPRUE SYNDROME

Ten years ago it was generally believed that fat was hydrolysed completely before it was absorbed from the intestine; that the fatty acids, products of this hydrolysis, combined with bile salts and entered the cells of the intestinal mucosa, where, after phosphorylation, triglyceride was resynthesized and passed into the general circulation by way of the thoracic duct. The work of Frazer and his colleagues at Birmingham[1] has led him to the opinion that the facts of fat absorption cannot be explained by this hypothesis. He considers that there are two paths by which fats enter the body. In his view, hydrolysis in the intestine is only partial, and the fatty acids and monoglycerides resulting from this process combine with bile salts to form an emulsifying system, which reduces the remaining triglycerides to an emulsion of particle size of less than 0.5 microns. This first stage he terms the intraluminar phase of absorption. The duality of the process becomes manifest later in the intracellular and distributive phases. Fat passes into the intestinal cell, in part as this finely dispersed emulsion and in part as fatty acid. Frazer believes that the fatty acids are distributed by the portal vein, but that triglycerides reach the blood stream by the thoracic duct. Factors concerned in the passage of the fatty acids through the cell membranes are unknown; but the transport of triglycerides at this stage is affected by normal water and electrolyte metabolism, by choline, and by the formation of phospholipid. It is suggested that the adrenals influence absorption by their control of water and electrolytes and not through phosphorylation, as claimed by Verzar.[2] If Frazer's views be accepted the postprandial increase in blood fat, shown by rising chylomicron counts and by the increase in serum lipids, is the result of the particulate absorption of triglycerides. It has been agreed by the proponents of the traditional lipolytic hypothesis[3] that in some circumstances direct absorption of fat can occur without preliminary hydrolysis. Frazer maintains that it is not a casual or occasional happening, but the main normal route for fat absorption; however, as Black and Fourman point out elsewhere in this issue, the proportion of dietary fat which is normally absorbed in this way is unknown.

For the clinician this exposition of the physiology of fat absorption has a particular interest at a time when the recent war has left a legacy of many patients with sprue. In the current number of the *Journal* Frazer reviews his "partition hypothesis" and points out its clinical application. Fat absorption can be defective because of faults in any of the three phases he describes. During the intraluminar phase emulsification may fail because of inadequate lipolysis, when secretion of pancreatic lipase is insufficient, as in atrophic pancreatitis, or because biliary obstruction excludes bile from the intestine. Specimens of intestinal contents, obtained by Miller–Abbott tube from the small bowel of patients with such disorders, have shown poor emulsification of fat. Absorption may be impeded in the third or distributive phase by obstruction to the lacteals by neoplasm, Hodgkin's disease, or tuberculosis; steatorrhoea resulting from these causes is reported by Ryle[4] and by Fairley and Mackie.[5] It is, however, the second phase which is of most interest to the physician, and unfortunately this stage is less easily susceptible of investigation. In tropical and non-tropical sprue, and in the steatorrhoea of regional ileitis, emulsification within the intestine is normal, and there is no reason to believe the distributive stage to be at fault; the defect, consequently, must lie in the intracellular phase. As Frazer points out, the first step in elucidation must be to determine whether the impairment is of absorption of fatty acid or of triglyceride. In this group of disorders it is not uncommon to find that 60–70% of ingested fat is absorbed without postprandial rise in the serum lipids or in the chylomicron count; this, he maintains, must indicate a defect in the absorption of particulate triglycerides.

Black and Fourman, in their studies of tropical sprue reported in this issue of the *Journal*, confirm the defective absorption of fat and stress the importance of the fat-balance method. On the subject of chylomicron counts they are more reserved, pointing out that variation in the size of particles is so great that identical "counts" may represent very different quantities of "chylomicron fat." They observed flat chylomicron curves only in patients who combined sprue with watery diarrhoea; but the increase in blood fat after a meal was less in the patient with sprue than in the normal individual; the increment in the phospholipid fraction was particularly reduced. Black

[1] *Physiol. Rev.*, 1946, **26**, 103.

[2] Verzar, F., and McDougall, E. J., 1936, *Absorption from the Intestine*. London: Longmans, Green.
[3] Bloor, W. R., *Physiol. Rev.*, 1939, **19**, 557.
[4] *Guy's Hosp. Rep.*, 1924, **74**, 1.
[5] *British Medical Journal*, 1937, **1**, 375.

and Fourman support Frazer's partition hypothesis of fat absorption, and their observations are in general accord with his views on the aetiology of sprue. In spite of many recent clinical and biochemical studies, the intimate nature of this group of diseases awaits discovery. Sprue is a syndrome of such complexity that its investigation offers peculiar difficulties. It is uncertain whether the impaired absorption of fat is the most important or only the most obvious defect; there is evidence that carbohydrates are absorbed inadequately[6]; in some instances salt depletion complicates the picture[7]; and symptoms referable to vitamin deficiencies are common at the onset of remission.[8] Black, Bound, and Fourman[9] have shown that fat absorption in sprue is not increased by injections of crude liver extract, although the patient's general condition improves rapidly. Folic acid likewise may relieve all the symptoms of the disease,[10-12] but does not increase the percentage of fat absorbed.[13] Such observations raise doubts whether the defect in fat absorption in sprue has the fundamental importance usually allotted to it.

Frazer's work has focused attention on the intracellular phase of particulate triglyceride absorption, and has been of much value in thus narrowing the field of inquiry. Nevertheless our knowledge of this process and of the factors which influence it is scanty; but if our understanding of the physiology of fat absorption is imperfect, enough has been said to show that the absorptive defects in the sprue syndrome are even more mysterious.

DISCUSSION WITH THE MINISTER

Recent correspondence in the *Journal* suggests that some members are uneasy because they have not yet been informed of the results of discussions that have taken place during the past months between representatives of the profession and the Ministry of Health. The situation was made clear in a leading article in the *Journal* of June 14. It was explained that six subcommittees set up by the Negotiating Committee were engaged in parallel discussions with the Ministry; that these subcommittees would report back to the Negotiating Committee before the autumn, and that the Negotiating Committee itself would then "seek a meeting or meetings with the Minister in order to press upon him all aspects of the considered views of the Committee, advised and instructed as it has been by all its constituent bodies." We went on to state that a summary of the representations made by the Negotiating Committee would be published together with the Minister's reply. This having been done, a plebiscite would be held after central and local discussions of the facts. A correspondent in the *Supplement* of Oct. 11 was in error in suggesting that "we have now been negotiated into a national State health service assumedly with the consent and the satisfaction of the majority of the medical profession." This is not true. The profession will decide its own fate when it is in full possession of the facts.

The last of the series of meetings between the General Practice Subcommittee and the Ministry of Health has now been completed. On Nov. 5 the Negotiating Committee will meet to consider the reports of its six subcommittees and the final form of the statement to be presented to the Minister himself. Meetings with the Minister will be held on Nov. 11 and 12, and it is expected that he will give a detailed reply to the points submitted to him. This reply and the Negotiating Committee's statement will be published shortly after that. When the medical profession has had time to consider and discuss these important matters it will decide by a plebiscite whether or not to take part in the National Health Service scheme.

CAVAL LIGATION FOR THROMBOPHLEBITIS

The problem of thrombophlebitis and pulmonary embolism is an old one, and for many years management has been largely expectant except for simple general measures to diminish the incidence by early mobilization of the patient, and the almost desperate attempt of Trendelenburg's operation to remove the embolus from the dying patient's pulmonary artery. During recent years we have learnt more of the pathology of the condition—notably that in many cases the initial lesion is in the deep veins of the calf and that secondary spread to the larger veins causes extensive oedema or a long, free, whip-like clot which extends proximally in the lumen and may lead to fatal embolism. Alternatively the site of thrombosis is the prostatic plexus or the pelvic and ovarian veins. Although it is not yet widely realized it is now taught that early diagnosis and treatment are essential if disability and death are to be avoided, and this was stressed in the recent discussion on post-operative thrombosis reported elsewhere in this issue (p. 666).

Moses points out that "phlebothrombosis resembles no other disease so closely as it does cancer in that the most significant phase of the disease occurs during the period when the diagnosis is the most obscure." Unfortunately it is still only too common to be confronted with a swollen painful leg in a patient who has had several days of stiffness, aching, or minor swelling which he has thought little of and in which belief he has been aided by the nurses or even house officers. They should be taught to report at once any symptom of this sort, and the patient should be asked, during the second week, whether any such symptom is present.

The treatment of the condition now lies between surgery and the use of anticoagulants, particularly heparin and dicoumarol. The chief advocates of the anticoagulants are the Swedish workers, and Bauer,[1] in a recent letter, claimed that anticoagulants have given such good results that surgery is unjustified. Surgical treatment has been favoured in America, and two recent articles, one by Moses[2] and one by Thebaut and Ward,[3] present some recent experiences. Moses performed 36 operations on 35 patients: 21 ligations of the inferior vena cava and 15 of the iliac veins. He has now abandoned ligation of an iliac vein because in some cases embolism may occur from the apparently normal other limb, the operation is often more difficult and dangerous, and the evidence suggests that oedema and secondary ulceration are less likely after ligation of the inferior vena cava. Thirteen of his 35 patients died after the operation, and 22 survived; most of those who died were in a poor or critical condition, and their deaths were due to the primary disease rather than to the operation.

[6] Fourman, L. P. R., *British Medical Journal*, 1947, **2**, 411.
[7] Black, D. A. K., *Lancet*, 1946, **2**, 671.
[8] Keele, K. D., *British Medical Journal* 1946, **2**, 111.
[9] *Quart. J. Med.*, 1947, **16**, 99.
[10] Spies, T. D., *Lancet*, 1946, **1**, 225.
[11] Morrison, R. J. G., and St. Johnston, C. R., ibid., 1947, **1**, 636.
[12] Manson-Bahr, P., and Clarke, O., ibid., 1946, **2**, 903.
[13] Davidson, L. S. P., Girdwood, R. H., and Innes, E. M., ibid., 1947, **1**, 511.

[1] *Lancet*, 1947, **1**, 498.
[2] *New Engl. J. Med.*, 1946, **235**, 1.
[3] *Surg. Gynec. Obstet.*, 1947, **84**, 385.

He favours a right extraperitoneal approach through a gridiron incision under spinal anaesthesia.

Thebaut and Ward report 36 cases of thrombo-embolism. The inferior vena cava was ligated in 34, and the other 2 died on the table before the vein could be tied. All the operations were undertaken for the prevention of further embolism in cases in which it had already occurred. There was no known recurrence of embolism in any of the patients operated upon. In addition to the two patients who died on the table two others died—one five hours and one twenty minutes after the operation. The follow-up period varied from 36 months to 2 months. No oedema was seen in 19 patients; 6 patients had slight oedema after standing all day, and 2 patients had slight persistent oedema. In none was the oedema incapacitating. The authors state that it is doubtful whether the oedema is any greater than would have been anticipated if the vena caval ligation had not been performed. An interesting observation is that in 6 out of 7 cases in which lumbar sympathectomy was performed at the same time the disease intensified clinically as shown by greater pain and tenderness or increased oedema. Thebaut and Ward favour an extraperitoneal approach unless they wish to tie the ovarian veins as well or to do a bilateral lumbar sympathectomy, in which case they use the transperitoneal route. They prefer a transverse incision for the extraperitoneal operation and favour spinal anaesthesia, or general anaesthesia if hypertension is present. Heparin and dicoumarol were used post-operatively in only one case. The patient is encouraged to get up as soon as his general condition permits.

Ligation of the inferior vena cava sounds a drastic remedy, and it still occasions surprise to many that it is indeed a feasible procedure. It is fatal only if the ligation is performed above the renal veins. Ochsner and De Bakey[4] mention 48 successful cases performed by 27 operators, the majority being performed for septic thrombophlebitis resulting from puerperal infection; there was no evidence of subsequent circulatory disturbance in the lower limbs of these patients. Perusal of these American case reports reveals many in which death was apparently inevitable without venous ligation. If ligation is to be undertaken it seems that a good case has been made for ligation of the inferior vena cava itself. It is certain that our attitude towards thrombophlebitis must change from expectant complacency to alertness and early interference, whether it be by surgery or by the administration of anticoagulants. Moses remarks, with justification, that tense oedema extending above the knee does not occur from a simple phlebothrombosis confined below the inguinal ligament, and "it is worthy of emphasis that this clinical picture represents gross neglect, and its occurrence in a hospitalized patient is indefensible." Several years must elapse before we can accurately judge the evidence produced by surgery and by anticoagulants; in the meantime the recording of further results from individual centres is highly desirable.

DICOUMAROL

The success of dicoumarol in the treatment of phlebothrombosis and thrombophlebitis has raised the question of its possible value in other thrombotic conditions, especially coronary thrombosis. Recent reports are favourable, and the fear that the drug might endanger life by causing or increasing subintimal coronary haemorrhage has not been substantiated. Results are difficult to judge in any given instance, but may be assessed from statistics. In Wright's[5] series of 76 cases the mortality rate for the treated illness was 25% in the group of 43 selected because of repeated coronary thromboses or the occurrence of emboli, and 12% in the uncomplicated group of 33 cases. Peters, Guyther, and Brambel[6] found a mortality rate of 4% in 50 cases of acute myocardial infarction treated with dicoumarol, compared with 20% in 60 controls not so treated. Nichol and Page[7] reported similar results. These figures are said to compare favourably with those of published controls which have been quoted by Master *et al.*[8] as 24% to 35% for the first attack and 38% to 53% for all attacks. On the other hand they are little better than those obtained with Master's 800-calorie diet—8% and 16.5% respectively. Thus, although dicoumarol appears to be life-saving, so may be other simpler measures. In stressing the low mortality rate of 12% in the group of 33 dicoumarol-treated uncomplicated cases in their first or second attack, Wright put the anticipated death rate at 20% to 30%. This is too high. Conner,[9 10] for example, found the mortality was 16.2% in his unselected series of 287 cases in the first attack.

Prevention of thrombosis elsewhere and of pulmonary embolism, as noted by Wright,[11] may be assumed. This alone provides adequate grounds for the use of dicoumarol in coronary thrombosis, for Eppinger and Kennedy[12] found that pulmonary embolism was the direct cause of death in 6.5% of 200 fatal cases of coronary thrombosis and was an important contributory factor in another 17.5%. Peters *et al.* observed clinical evidence of embolism in only 2% of their 50 treated cases, compared with an incidence of 16% in 60 controls. Dicoumarol therapy must be controlled by daily estimations of prothrombin time and should continue for at least a month. The prothrombin time is kept at about one and a half times the normal value by means of daily doses of 100 to 300 mg. of dicoumarol. If the prothrombin time exceeds one and a half times the normal the drug should be temporarily discontinued. Haemorrhagic manifestations include haematuria and melaena, and may be treated with 50 to 100 mg. of vitamin K intravenously or with blood transfusion.

ACUTE INFECTIVE DIARRHOEA AND ENCEPHALITIS

Enteritis, colitis, steatorrhoea, and many other conditions of similar type, though clinically common and as a rule easily diagnosed, are for the most part of unexplained aetiology. Infantile diarrhoea has an important place in this group of diseases which affect the intestines. Leaving aside dysenteric types of infection and those caused by contaminated milk, there still remain a number of cases of varying severity to which the name "acute infective diarrhoea" is usually applied, despite the fact that usually no infective agency is demonstrable. Amid a mass of speculation the only feature which seems to be generally accepted is that at necropsy evidence of enteritis is often surprisingly slight.

A recent paper by E. Christensen and K. Biering-Sorensen[13] may furnish a clue to the underlying pathology in at least some of these cases. They describe a "particularly malignant gastro-enteritis" appearing usually in epidemic form in institutions and affecting some 500 infants under 9 months of age. Clinically there was a cerebral type of vomiting, and there were marked disturbances of the water–salt metabolism. Post-mortem examination

[4] *Lewis's Practice of Surgery*, **12**, Chap. 5 B. Hagerstown. 1943.
[5] *Amer. Heart J.*, 1946, **32**, 20.
[6] *J. Amer. med. Ass.*, 1946, **130**, 398.
[7] *Florida med. Ass. J.*, 1946, **32**, 365.
[8] *Amer. Heart J.*, 1936, **12**, 549.
[9] *Lancet*, 1930, **2**, 83.
[10] *Amer. Heart J.*, 1930, **5**, 705.
[11] *N.Y. St. J. Med.*, 1946, **46**, 1819.
[12] *Amer. J. med. Sci.*, 1938, **195**, 104.
[13] *Acta path. microbiol. scand.*, 1946, **23**, 395.

revealed no evidence of intestinal infection, but of 32 fatal cases 8 had meningo-encephalitis, 18 meningitis without brain involvement, and 6 congestion and oedema of the brain and meninges. In two-thirds of these cases the cerebrospinal fluid showed a moderate increase in cells (type unspecified), but all cultures were negative. Duzar and Balo[14] had earlier demonstrated a similar meningo-encephalitis in 7 cases in a similar epidemic, and concluded that the condition was one of encephalitis lethargica. A few other cases of the same kind have been reported, about a dozen in all.

All these Copenhagen cases had a typical histological picture: congested cerebral vessels, pial infiltration with lymphocytes, perivascular round-celled infiltration, and early chromatolysis of the ganglion cells, with in one case early miliary abscess formation. Possible aetiological mechanisms are a primary encephalitis as suggested by Goldzieher,[15] a general virus infection with associated encephalitis, a mixed infection with a neurotropic virus, and toxaemia combined with dehydration. The two authors incline towards the theory of a virus infection with a concomitant encephalitis, though they do not exclude the possibility of a toxic encephalitis. Whatever the explanation, it is clear that we have in these cases an inflammation of the brain as opposed to a condition of simple dehydration or meningism. Further work is necessary, but if these findings can be confirmed "acute infective diarrhoea" in infants must be viewed from a new standpoint. If it can be shown that the symptomatology is wholly or in a large part due to cerebral lesions, the notable absence of post-mortem changes in the gut in this type of case will no longer be a matter for surprise and the therapeutic approach will be altered.

EXPERIMENTAL TUBERCULOSIS

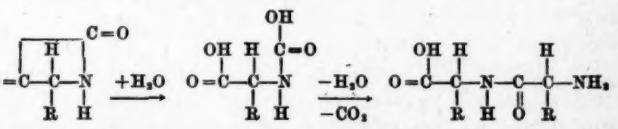
Dr. René J. Dubos, the discoverer of gramicidin, has recently been engaged on a programme of research on tuberculosis, the results of which he reviews in a recent paper[16] entitled "The Experimental Analysis of Tuberculous Infections." The objects defined at the outset are so fundamental that they involve an almost entirely new approach to the disease. The first aim was to devise a culture medium supporting rapid and diffuse growth and thus providing uniform material containing a high proportion of viable cells for experimental purposes. This aim has been achieved. A liquid medium has been devised in which diffuse submerged growth is obtained in a few days. The essential new constituent is a wetting agent known as "Tween 80," an ester of oleic acid, which is believed to be adsorbed on the surface of the tubercle bacillus and thus to render it dispersible in water. It is probable that this substance also facilitates absorption of nutriment; it may itself contribute to the nutrition of the organism. Such cultures retain a highly viable population for months, and form stable suspensions which can even be used for agglutination tests. The medium can be solidified with agar and used in that form for viable counts.

The animal chosen by Dubos for the study of the experimental disease is the mouse. When mice are inoculated with tubercle bacilli grown by ordinary methods a large inoculum is required to cause fatal infection, and even so the results are apt to be irregular. A small inoculum of tubercle bacilli grown in the new medium and injected intraperitoneally along with certain adjuvant substances, of which egg yolk is the most effective, regularly produces widespread infection and death in two to four weeks. This paper makes only brief reference to other factors affecting the course of the experimental disease which have now been studied: Dubos communicated some of these results to the International Congress for Microbiology held in Copenhagen recently.[17] It has been found that the resistance of different strains varies greatly. Albino mice are the most resistant; C3H are also resistant to intraperitoneal injection, less so to intravenous. C57 black, on the other hand, are highly susceptible to inoculation by both routes. It seems from these findings that different strains of mice afford a fairly wide range of natural resistance within which a choice can be made according to the precise purpose of an experiment. The effect of diet on the disease was also studied; the mortality was lower in mice fed on bread and milk than in those on a diet of corn meal. Finally, the remarkable observation was made that when mice were given a minimal dose of tubercle bacilli, such as to produce only minute lesions in otherwise untreated animals, inoculation with a small dose of influenza virus three weeks later caused extensive tuberculous lesions to develop in the lungs.

Thus a single initial advance in technique has opened a new field of possibilities in the study of tuberculosis. This acute disease in mice, already shown to be capable of exact adjustment to experimental requirements and to be influenced by factors hitherto no more than conjectural, is ideally suited to studies of many kinds. It is safe to predict that the use of guinea-pigs for the assay of chemotherapeutic agents for this infection will be largely superseded. Dubos is at pains to defend this mouse infection as a suitable experimental tool, citing pneumococcal peritonitis in mice as an equally unnatural condition which has nevertheless proved useful in the same way. This defence seems scarcely necessary; the disease is, as he says, "an overwhelming haematogenous invasion of an animal possessing a fair degree of natural resistance, but no acquired immunity or hypersensitiveness." This being so, it is not far removed from the more acute forms of tuberculosis in man.

PROTEIN ANALOGUES BY SYNTHESIS

Woodward and Schramm have reported a reaction that produces linear high polymers of amino-acids in peptide linkage.[18] The reaction is not new, but its implications were not appreciated by the German workers who first stumbled on it forty years ago. The type of monomer used is an inner anhydride of the N-carboxy derivative of an amino-acid. Polymerization can be initiated by, for example, the trace of water present in reagent benzene used as solvent. The reaction can be pictured as proceeding by the addition of water to yield the labile N-carboxy amino-acid, which then couples with another molecule to form a dipeptide, with loss of CO_2 and H_2O; the latter catalyses further reaction, leading either to lengthening of the chain or to the start of a new chain.



On standing for several days the solution becomes increasingly viscous; on evaporation it can be made to yield films or threads of "synthetic protein." A product made by co-polymerization of *l*-leucine and *dl*-phenylalanine in this way had a molecular weight of the order of 5 million, corresponding with at least 10,000 amino-acid units. The product is a protein only in the sense that it is composed

[14] *Jhrb. Kinderheilk.*, 1922, **99**, 209.
[15] *Amer. J. Dis. Child.*, 1930, **40**, 446, and *Klin. Wschr.*, 1930, **9**, 981.
[16] *Experientia*, 1947, **3**, 45.
[17] *British Medical Journal*, 1947, **2**, 180.
[18] *J. Amer. chem. Soc.*, 1947, **69**, 1552.

solely of amino-acids, linked as in proteins. By co-polymerization of mixtures of their carboxy anhydrides, amino-acids could doubtless be linked together in any desired number and proportion, but there is no likelihood that the order of linkage could be controlled so as to imitate any particular protein, even if we knew the correct order. Nor could the chain length be accurately fixed, though some control might be exercised by varying the concentrations of starting materials and catalyst.

There thus appears little justification for the sweeping suggestions in the American press that this discovery may provide the means of producing new synthetic antibiotics or of modifying the infectiveness of viruses by altering at will the size and structure of protein molecules. Also any fibres or films produced in this way would need to have outstanding advantages over existing natural and synthetic textiles and plastics to justify the high cost of the raw materials. Of great theoretical interest is the fact that these complex compounds of high molecular weight, similar in many chemical features and physical properties to natural proteins, can be built up from molecules that are not only relatively simple in structure but may even be synthesized themselves from materials of no more "vital" origin than ordinary coal-tar intermediates and other primary reagents of organic chemistry. True, the amino-acids thus made in the laboratory lack one characteristic, indeed unique, feature of the naturally occurring compounds. They are all optically inactive, consisting of equimolecular parts of the natural and unnatural isomers. Consequently any of Woodward's compounds made entirely from synthetic materials—unless these are first "resolved"—will have no action on the plane of polarized light. With this limitation, however, and all that it may involve in more purely biological behaviour, Woodward's researches may still be legitimately regarded as an important extension of the discovery, more than a century ago, that urea, previously regarded as a typical product of the living animal organism and beyond the synthetic power or scope of the chemist, could be made from such inorganic substances as ammonia and carbon dioxide.

That discovery, still generally attributed to Wöhler, marked an epoch in chemistry and biology; it was the essential step that led to the birth of biochemistry. Woodward's work is technically a much more complex achievement and perhaps even a more brilliant one. However unlikely its immediate industrial or medical applications, it is certainly worthy of attention, if only to dispel the suspicions that may have been aroused by some jaunty extrapolations in the American press.

PROTEIN METABOLISM IN INFANTS

In recent years there has been an increasing use of special digests of protein for the feeding of premature and sick infants, and with this has come a re-examination of various aspects of protein metabolism. Prof. Emmett Holt and his co-workers in Baltimore and later in New York, first in rats and in adults and later in infants, have started some important and fundamental studies in this subject, some details of which are now available.[1] The testing of the nutritional quality of some available milk preparations in the normal infant has been carried out by careful metabolic studies in three normal full-time male babies. Four types of diet were used: an evaporated milk mixture, a mixture based on an enzymatic digest of casein, a similar digest of lactalbumin, and an acid digest of casein supplemented with tryptophan and cystine. All the four diets were given in five daily feeds on a basis of about 100 calories per kilogram, supplemented with ascorbic acid and "oleum percomorphum." Brewer's yeast was added to supply the vitamins of the B complex. Each batch of the diet mixture was assayed for its nitrogen content and the daily nitrogen intake of the subjects calculated for the seven-day period of the test. Each infant received the four diets for consecutive periods, and from the urine, faeces, and blood elaborate estimations were made of the nitrogen output, haemoglobin, total plasma proteins, albumin, globulin, non-protein nitrogen in the blood and in the urine, amino-acids, urea, and other substances. In summary the nitrogen retention and weight gain of the three infants while on the acid digest of casein mixture were respectively about 30 and 50% lower than those obtained when the same subjects were given synthetic diets based on enzymatic digests of casein or lactalbumin. Fluid, calorie, and nitrogen intake were essentially the same with all the diets. The biological value of these two enzymatic digests was about the same as that of the evaporated milk mixture used as the fourth test material. It is suggested that the acid digest of casein lacks certain peptide-like substances ("strepogenin") occurring in the enzyme digests and that the strepogenin fraction is required for the maximal utilization of amino-acids in the diet.

These broad studies, so to speak, are followed by a detailed investigation of tryptophan requirements in the infant, conducted on three healthy male infants in much the same manner as the previous study. A tryptophan-deficient diet was used—an acid hydrolysate of casein—and as control a similar diet with a tryptophan supplement added step-wise to supply 0.5, 1.0, and 1.5% of the protein content. Cystine was added to all four diets and brewer's yeast again as a source of B-complex vitamins, together with ascorbic acid and oleum percomorphum. The measurements of intake and output were conducted as already described. In all three subjects on the tryptophan-deficient diet there was a marked decrease in the daily weight gain and a drop in nitrogen retention—equivalent to a negative nitrogen balance in the fully grown adult. Within ten days a tryptophan-poor diet caused an appreciable fall in the blood protein level chiefly reflected in the albumin content. In one subject the plasma proteins returned to nearly normal levels on the diet with the 0.5% added tryptophan, whereas it required the 1.0% addition to restore nitrogen retention, weight, and urinary tryptophan to normal, which suggests that blood proteins have a claim on the available nutrients prior to those of other tissues. Urinary studies suggested that the tryptophan level of the urine may serve as a useful criterion for the estimation of the minimum dietary requirements of this amino-acid. Previous studies on adults had suggested that the tryptophan requirement of an adult was about 6 mg. per kg. of body weight. The present work puts the level for infants between 5 and 12 months of age at about 30 mg. per kg. of body weight for normal growth, and this explains in part the high protein needs of the growing infant. Another difference from conditions in adults is that even after 6 weeks' tryptophan-deficient diet there was no change in the level of plasma proteins. An interesting point was a severe anorexia on the tryptophan-deficient diets in the three infants; it was not caused by taste.

[1] Albanese, A. A., Holt, L. E., *et al.*, *Johns Hopk. Hosp. Bull.*, 1947, 80, 149, 158.

The Bradshaw Lecture will be delivered by Dr. Janet Vaughan, F.R.C.P., before the Royal College of Physicians of London (Pall Mall East, S.W.) on Thursday, Nov. 6, at 5 p.m. Her subject is "The Anaemia Associated with Trauma and Sepsis."

UGANDA JUBILEE

INTERTERRITORIAL MEETING OF THE EAST AFRICAN BRANCHES OF THE B.M.A.

This meeting, which was held in honour of the fiftieth anniversary of the arrival in Uganda of Sir Albert Cook, was opened at Kampala on Sept. 3 by H.E. the Governor of Uganda, Sir John Hathorn Hall. Dr. A. J. Boase, president of the Uganda Branch, gave the presidential address, in which he outlined the history of the British Medical Association in East Africa and paid tribute to Sir Albert Cook. He also welcomed to the meeting Mr. J. L. Gilks, who brought the good wishes of the Council of the B.M.A. The meeting was also attended by delegates from Kenya, the Sudan, Tanganyika, and the Belgian Congo. One of the outstanding addresses was that by Sir Albert Cook, himself, on the history of Mengo Hospital, which was the subject of a special article in our issue of Aug. 30 (p. 342). A copy of this issue of the *Journal*, published only four days before the meeting, was sent by air mail to Kampala for the occasion, and was then exhibited with a collection of photographs, books, and records dealing with the early days at Mengo Hospital.

Health of Africa

Dr. A. R. Patterson spoke on the "Health of Africa," drawing attention to the twin evils of over-population and loss of soil fertility, problems which would demand the closest attention in the near future in East Africa. He suggested that now was the proper time for a Royal Commission to study the whole matter. A paper on syphilis in Africans was read by Dr. Bali in the absence of the author, Dr. J. de Mello, of Nairobi. The author believed that there had been a big increase in the incidence of syphilis in Nairobi, both in the town and in the reserves, since 1939, particularly among domestic servants. After describing the clinical findings in Africans, he called for a greater measure of control of the disease and of supervision of those affected.

Dr. H. M. Woodman, of Juba, speaking on filariasis in the Southern Sudan, pointed out that in this area all forms of filariasis existed and the incidence of the disease was high, but there were many puzzling features. The insect vectors of filariasis found elsewhere to be important were either rarely found or, if found, were not important in the Sudan, and he concluded that the insect vectors responsible in this region were still unknown.

Dr. J. A. Carman, of Nairobi, read a paper on the use of curare in anaesthesia. Then Dr. R. B. Baird described his researches into the causes of tropical pyomyositis. The condition was such a common cause of invalidism that its prevention was a matter of great economic importance. Dr. Sanade then described his experiences with cases of blackwater fever.

On the Friday morning the meeting heard an account by Dr. J. N. P. Davies of a form of heart disease common at Mulago but hitherto undescribed in East Africa. After inspection of the photographs and specimens, delegates agreed that this endocardial necrosis and fibrosis was a novel and obscure condition; it was asserted that it did not occur in Nairobi. A large audience listened to a paper by Dr. Frank Hawking, Joint Secretary of the Colonial Medical Research Council, who dealt with recent advances in the chemotherapy of tropical diseases—penicillin and streptomycin, and the new sulphonamides—and then made a survey of the newer drugs available for many tropical infections. This authoritative review led to a deluge of questions, to which the speaker replied until he had to be rescued by the President, and the Conference was moved on to drink coffee and to subject Dr. Hawking to more intimate questioning.

Later the meeting divided into two sections. The Surgical Section heard a paper by Mr. D. Burkitt on the treatment of hydrocele, while at the Medical Section Dr. P. Hutton and Dr. A. Raper opened a discussion on tuberculosis in the African. It was pointed out that the results of treatment were very poor. Most infections were primary infections and the African had no initial resistance and did not develop any. The infections were acute and the mortality heavy. Few Africans responded to treatment, and so the only hope of avoiding a grave problem as Africa became industrialized was to search for some method of building up African immunity. With the advent of B.C.G. vaccine and the "vole bacillus" vaccine, a possibility had arisen that immunity could be built up without a great wastage of African lives. Mr. I. W. J. McAdam and Dr. Billington opened a discussion on tropical ulcer. Mr. McAdam showed a number of cases treated by penicillin and skin grafts. Dr. Charters described the effects of different diets upon these ulcers in Somali and other soldiers living under identical conditions in the Army.

Finally a business meeting of the East African Branches was held, and is reported briefly in this week's *Supplement* at p. 98. Afterwards the delegates were entertained at the Sisters' Mess, Mulago. In the evening most of the delegates and their guest, the Hon. C. L. Mortimer, Member for Health and Local Government in Kenya, dined at the Imperial Hotel. Most of the visitors to Uganda left on the Saturday, and so ended this tribute paid by his colleagues to the doyen of the profession in East Africa—Sir Albert Cook.

THE WORLD HEALTH ORGANIZATION

The foundations of the World Health Organization are being well and rapidly laid. It will be recalled that the organization, which is one of several specialized agencies forming part of United Nations, was established after an international conference in New York in the summer of 1946. Its structure and functions were described in this *Journal* by Dr. Melville Mackenzie (Sept. 21, 1946, p. 428), United Kingdom delegate to the conference and a member of the Interim Commission, a body charged with the preparatory work of the Organization. Towards the end of last year the staff of the Health Section of the League of Nations was taken over by the Interim Commission; at the beginning of the present year the functions of the Epidemiological Intelligence Department of the Office International d'Hygiène Publique were transferred, and also the health activities of Unrra, and negotiations were proceeding for the incorporation of the Pan-American Sanitary Organization.

Liaison has been established with the several other specialized agencies of United Nations concerned with public health. These are the International Labour Organization, originally founded in 1919 by the Treaty of Versailles; Unesco, established in 1945; the Food and Agriculture Organization, set up in the same year for the purpose of raising standards of nutrition in all countries; and, the latest of these agencies, the International Civil Aviation Organization, which will be concerned, among other matters, with the certification of inoculation and vaccination of air passengers and crews. Other organizations of United Nations which have activities related at some point to W.H.O. are five of the principal commissions—namely, those concerned with statistics, changes of population, narcotic drugs (the successor of the old Fifth Committee of the League of Nations), social questions, and transport and communications. Joint committees have been set up with certain of these agencies. Thus a nutrition committee will advise both W.H.O. and F.A.O., and it is proposed to have two joint technical commissions of W.H.O. and I.L.O., one to concern itself with industrial hygiene and the other with the provision of medical care. Certain non-governmental agencies, such as the international unions against tuberculosis, cancer, and venereal disease, have wanted to establish relations with W.H.O., but the Interim Commission has felt that such arrangements should be deferred for the agenda of the first assembly.

A matter which brooks no delay is epidemiology and quarantine. A committee for this purpose has been set up under the chairmanship of Dr. Melville Mackenzie. The problems arising out of the application of existing sanitary conventions and the value of the methods used for collecting and disseminating epidemiological information are being examined. An expert subcommittee on malaria has been set up as well as another on yellow fever, and a small body of experts has been appointed to form the nucleus of a future committee on biological standards. Proposals to consider the setting up of a tropical diseases institute and the formulation of an international programme for combating venereal diseases have been deferred for the time being, and another matter remitted to the agenda of the assembly is a proposal to undertake a comparative study of central public health services in various countries and of the resources at present available in such countries for training

medical and other staff essential for public health services. Another technical committee has been appointed to consider the international list of causes of death and the establishment of a list of causes of morbidity. Finally, a committee of five experts technically qualified in the pharmacological and clinical aspects of drug addiction has been established to advise on technical questions concerning habit-forming drugs.

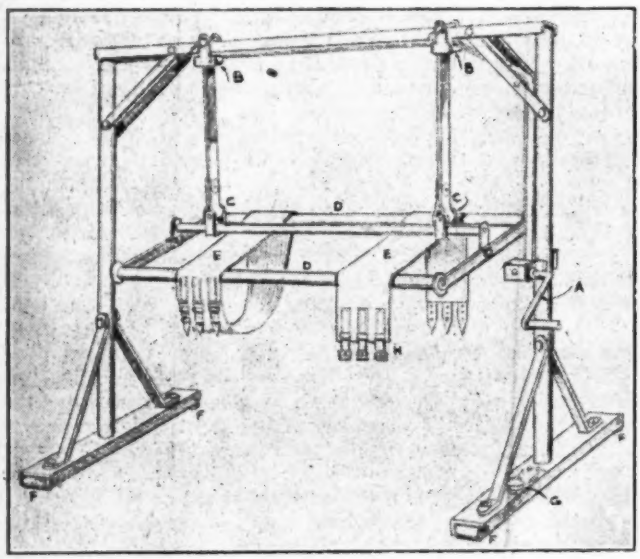
A committee, with representatives of Canada, Egypt, Mexico, India, and Norway, has been considering the question of a permanent headquarters for W.H.O. There are many considerations: the privileges which would be granted by the host State, the internationalization of the site, its accessibility to the world at large, climatic considerations, and the general use by the local population of one of the working languages of United Nations. Various Governments have been asked to state their views. From the point of view of accessibility (14 hours from London by air), language, and position, almost at the junction of three continents, there is something to be said for Cairo. In the western hemisphere some advantages might be claimed for New Orleans. On the other hand, Geneva has the international tradition, for eighty years the centre of the International Red Cross and for twenty years the home of the Health Organization and the I.L.O. But the final selection may be none of these.

Preparations and Appliances

APPARATUS FOR LIFTING PATIENTS

Dr. J. GUBBINS, Clonmel, Eire, writes : In these days of shortage of nursing staff a description of the following apparatus for turning and lifting a helpless patient should be of great interest to the medical and nursing professions.

A is a handle to wind up and down by means of belts that pass over rollers at B which are adjustable to move up and down the bed. The belts pass to and are fastened to a bar at C, to which the rollers D are attached. Over D pass two slings of appropriate length and width which after being passed under the patient are buckled at H. The whole may be lifted by



turning handle A. By gently pulling the slings E the patient may be easily turned over. The height and width of the stand are suitable for a standard hospital bed, and by means of the wheels F the apparatus may be moved to any desired position. A brake screw, G, keeps the stand steady.

I can vouch for the efficiency of the apparatus, having originally designed it and used it as a patient for six months. Mr. C. Cullen, engineer, of Langford, Bristol, made the original machine, and greatly improved my own rather crude idea. Two models are now in use at Winford Orthopaedic Hospital, and the staff there tell me they are invaluable. One nurse can lift and turn a patient, whereas before the apparatus was used three nurses at least were required.

Reports of Societies

POST-OPERATIVE THROMBOSIS

A discussion on post-operative thrombosis was held in the Section of Obstetrics of the Royal Society of Medicine on Oct. 17, Mr. A. J. MCNAIR presiding.

Chemical and Mechanical Factors

Dr. HELEN PAYLING WRIGHT said that pulmonary embolism had been estimated to follow in one out of every hundred major operations, and about one case in six was fatal. The incidence of thrombosis was almost twice as great in females as in males, and most frequent after operations in which the abdominal cavity was opened and the pelvic viscera explored. The main changes during the post-operative period were a rise in the fibrinogen content of plasma and increased activity of prothrombins. Fibrinogen was shown to undergo diminution in concentration immediately after operation, and subsequently to increase by the third or fourth day to nearly double the pre-operative value. Estimation of fibrinogen B, an intermediate substance produced by conversion of fibrinogen to fibrin, if taken in conjunction with the prothrombin time and the temperature, would, it had been suggested, give a reliable prognosis. She was not convinced, however, that a great increase in the fibrinogen B fraction in the post-operative phase was pathognomonic of incipient thrombosis; she had found that following operation or delivery the fibrinogen content of the plasma increased in all patients. Prothrombin estimations also showed increased activity even in the absence of any clinical or demonstrable thrombosis. It seemed likely that these changes occurred invariably in the post-operative period. As for the remaining criterion, the temperature, it was well known that urinary or chest complications, or even lactation, might cause an unexpected rise. The only safe course was to rely on clinical observation of the patient in the post-operative or puerperal period.

The part played by blood platelets in initiating thrombi in injured blood vessels was well recognized. These elements increased after operation or parturition; usually the increase became apparent on the fifth or sixth day and reached a maximum about the tenth day. The increase in the platelet count was correlated with the severity of the operation. The more extensive the tissue damage the greater the platelet response. She had observed a further change in platelets in this phase, namely, a greater adhesiveness, at a maximum again at about the tenth day. It appeared that the young cells which had entered the circulation in response to the stimulus of the trauma were responsible for this change.

The importance of venous stasis was first stressed almost a century ago. It was now recognized that the thrombotic process usually started in the small plantar and calf veins, not in the femoral vein itself. Formerly anatomists thought that Poupart's ligament played an important part in thrombosis by causing constriction of the vein at the pelvic brim. Dr. Wright here related some experimental work she had carried out which pointed to the likelihood of some constriction at that point, causing the appearance of small emboli. Radio-active sodium^{24} was injected into the foot in a subject known to have severe varicose veins. At the end of a minute no radio-active substance was reaching the counter over the groin; at that moment, however, the subject flexed his foot dorsally, and within two seconds a shower of gamma rays was recorded in the femoral vein. Evidently the blood had been held up, and a slight movement was sufficient to move it along at a much increased rate. The importance of supervised exercises and early ambulation must be emphasized in the prevention of thrombus formation in the post-operative and parturient phase.

Morbid Anatomy and Some Clinical Indications

Dr. MAGNUS HAINES said that it should be remembered, first, that thrombosis was often symptomless and without physical signs; secondly, that the time of onset was variable; and, thirdly, that most of the patients were over 40 years of age. It was held by some that nearly all fatal emboli occurred in

cases of unsuspected thrombosis. The mechanism by which the thrombus became separated was another problem. In some cases small pieces of the proximal end of the thrombus were detached; in others the embolus was 40 or 50 cm. in length.

Records of cases of post-operative thrombosis were scanty. There was no difficulty in keeping a record of the fatal cases, but the same should be done with patients who recovered. Dr. Haines then reviewed the operations for the period 1927–46 at the Chelsea Hospital for Women. They numbered 30,000, and among them there had been 55 cases of fatal pulmonary embolism. The abdominal operations numbered over 11,000, with 43 fatal cases of pulmonary embolism. The series could be divided into two periods, the beginning of the second period coinciding with the establishment of a regime of post-operative physiotherapy. The mortality from pulmonary embolism fell considerably during the second period, but the fall, roughly speaking, was of the same general order as the fall in the death rate from other causes, so that the physiotherapy did not appear to have made a significant difference. With few exceptions these figures related to a period unaffected by the use of any form of anticoagulant. It would be interesting to report on the next ten-year survey, when a greater reduction in mortality might be expected as a result of the use of these substances.

Surgical Precautions

Mr. A. Dickson Wright said that the occurrence of thrombosis and embolism after operation or childbirth was freakish and variable. It varied from country to country, from hospital to hospital, even from ward to ward. In German hospitals they were very "thrombosis-conscious." He remembered seeing posted on the walls of a Charlottenburg hospital, "Breathe deep, spit hard, and wave your hands in the air." Nature, by causing the blood to clot, "has prevented us from dying from haemorrhage, only to enable us to die from thrombosis." Any disease with a 30% mortality demanded the greatest exertions on the part of those looking after the patient. Apart from haematological factors, certain mechanical factors were involved, of which Fowler's position was the chief. It caused venous stagnation of the legs and pelvis, and it had been shown to be of little advantage for peritonitis, for which it was invented; it should be abandoned. It was good for the patient to sit up in bed, but he should lie down flat at night and for the afternoon siesta, and be encouraged to lie on his side. Early ambulation was now expected and enjoyed by the public and by the nurses, except for a few die-hards. In some cases in America, he believed, the patients were walked off the operation table. Early ambulation was not possible, however, with catgut suture of the abdominal wall. Bleeding should be minimized, for with the shedding of blood the risks of thrombosis were greatly increased, as also in miscarriages and in post-partum haemorrhage. It was a bad custom to put the patient to bed for some days before operation. A dangerous case from the point of view of thrombosis was one which had been treated in bed by the clinician for a long time unsuccessfully and then handed over to the surgeon. Such a patient should be got up and walked round a little. If the patient had to be kept in bed long after operation some deep breathing and muscle-twitching must be carried out. The patient with a history of thrombosis, personal or family, required most careful consideration. No intravenous anaesthesia or pyelography should be carried out in such a case. It was worth while tying both femoral veins as part of the operation itself. Figures from a Boston clinic in which in some 400 cases the vein had been tied as a routine and in another 400 had not been tied showed a reduction of all post-operative venous trouble in the first group as compared with the second. There was an idea that after childbirth only the classical "white leg" was seen; this was not so at all, the whole gamut of manifestations of thrombosis had been observed. In a ward in the North-Western Fever Hospital, where twelve women were suffering from puerperal thrombosis, all the different types were seen.

First Signs of Thrombosis

Very often (Mr. Dickson Wright went on) pulmonary embolism was the first sign that thrombosis was taking place. It was a good thing to regard every case of pleurisy after operation as due to a pulmonary embolism. Frequently these were regarded as cases of simple pleurisy and attributed to post-operative chills, cold corridors, and so forth. One specimen of blood-stained sputum during the twenty-four hours after operation clinched the diagnosis of embolism. A stitch-like pain in the ribs after operation was another indication. Thrombosis of varicose veins after operation and of the normal superficial veins was a worrying complication; it showed that the patient was "in a mood to thrombose." Careful examination was called for in such cases, and he would ligate the common femoral vein on the affected side. Iliac thrombosis was of special interest to the gynaecological surgeon. The condition was treated by lumbar ganglionic block.

Mr. Dickson Wright pleaded for the prompt use of heparin, big doses of which should be given immediately and continued for two or three days until dicoumarol, started at the same time, could take over the anticoagulant action. He had used a great deal of dicoumarol, and had had no mishaps at all. It was a most valuable drug.

In conclusion, he said the price of freedom from post-operative thrombosis was unrelaxing vigilance. Signs must be looked for in the calves of the legs, under the ribs, and in the temperature chart. All surgeons had experienced the vindictiveness of relatives after a death from embolism. They would not listen to the "bad luck" story at all, and from now on, with anticoagulants available, they were likely to show less mercy, and might even exact retribution for precautions left untaken.

Gynaecological Considerations

Mr. Leslie Williams said that gynaecologists in the past had had a bad reputation for cases of post-operative thrombosis, but he did not think they deserved it any more than the general surgeon. The basis of modern treatment was that these thrombi practically always started peripherally, in the small deep veins of the calf, not in the iliac veins, as they rather tended to think. Active movements were valuable. Sir William Fletcher Shaw had described two wards in different hospitals, under the care of the same gynaecologist, admitting the same type of patient, and in which the same pre-operative and post-operative treatment was carried out except that in the one hospital systematically graduated post-operative exercises were given, and not in the other. In 1,635 consecutive operations followed by graduated exercises the incidence of fatal embolism was 0.06%, and in 3,618 operations not so followed it was 0.30%, or five times as great. Some cases even of sudden and severe pulmonary embolism could be saved if large doses of heparin were given immediately. In this country the quantities given were not large enough. They talked of 5,000 units, but this was only 50 mg. and utterly inadequate. A dose of 125 mg. should be given immediately intravenously, followed by doses of 100 mg. every four or five hours, until such time as dicoumarol, given simultaneously, took effect. The ligation of the femoral vein on both sides following the discovery of venous thrombosis seemed to him a bit of "blood and iron surgery," and he could not bring himself to like that idea at all. Paravertebral sympathetic block, on the other hand, was a treatment to which he gave almost unqualified praise.

Dr. Kenneth Ball described the measures taken in a Middlesex county hospital. A combination of heparin and dicoumarol was used, heparin being given by intravenous drip for from 48 to 72 hours. In puerperal cases a total dose of 60,000 international units of heparin was given in the course of 50 hours. He gave some figures comparing an earlier series of cases treated conservatively, with complete immobilization, with a later series treated with anticoagulants. His inference from the figures was that the present treatment had shortened the stay of these patients in hospital to three weeks and their confinement in bed to one week.

Dr. John Howkins considered the Trendelenburg position the prime offender. The position was essential in gynaecological operations, but a generous sorbo rubber pillow should be provided, and some means of support should be given to the ossa innominata by a clamp which held the patient up by the pelvis. A type of clot not mentioned was that which originated at the site of operation; it was particularly liable to occur in operations on a septic site. More thrombosis, in his experience, followed subtotal than total hysterectomy; whether the

stump provided a sort of "locus of clottery" he could not say. In necropsies he had noticed that the clot did not occupy the whole of the lumen; what killed the patient was not the clot but the immense spasm which the clot evoked. Fowler's position was out of the question. The patient should be allowed to lie in the position in which she was most comfortable.

Dr. V. B. GREEN-ARMYTAGE mentioned the absence of embolism following the Fothergill operation. He also drew attention to the earliest and most dramatic description of the condition (Numbers v. 21–2). Mr. MCKIM MCCULLAGH spoke of the importance of good theatre work in avoiding disaster. In their replies Mr. DICKSON WRIGHT reaffirmed his contention that it did no harm to tie the femoral veins, and Dr. HELEN PAYLING WRIGHT expressed an emphatic view that the fundamental cause of thrombosis was still unknown.

ACUTE POLIOMYELITIS

At a meeting of the Section of Epidemiology of the Royal Society of Medicine on Oct. 6 Mr. K. I. NISSEN reported on the outbreak of poliomyelitis on St. Helena in 1945–6. It was preceded by an epidemic of influenza of the usual seasonal type. In the population of under 5,000 there were 11 deaths, 66 paralytic cases, and 142 abortive or non-paralytic cases. Most of the latter were so ill for a few days that they had to be admitted to hospital.

Two special clinical features were recorded: the dorsum of the tongue was not furred but was bluish-grey in colour, whereas the margins showed bright red papillae; the odour of the stools was extremely pungent. Only 4% of the cases were children under 5. The small European population, the garrison, and the island recruits appeared to be immune. It was thought that this fact, together with the relative immunity of young children, might have been due to a higher vitamin-C intake, but the evidence on this point was inconclusive.

Dr. L. J. M. LAURENT gave an account of 13 patients admitted to the Park Hospital in the summer of 1946 who all had aseptic lymphocytic meningitis; some had encephalitic symptoms, and one died in coma. All the others had recovered without paralysis or other sequelae. None had been in contact with cases of poliomyelitis. All attempts at isolating a virus from the cerebrospinal fluid, and from the nervous system of the fatal case, by animal inoculations had been unsuccessful. The aetiology was undecided. During the present outbreak of poliomyelitis a number of similar cases had been admitted, and they were all assumed to be due to the virus of that disease.

Dr. DOUGLAS MCALPINE said that the number of cases of poliomyelitis and polio-encephalitis notified this year up to the present time exceeded 6,500; the corrected figure was probably less than two-thirds of this total. It had become increasingly clear that cases occurred all the year round—an important epidemiological point. A preliminary estimate from the Ministry of Health suggested that at least 20% of all notifications had been over the age of 15—a fact which confirmed the upward trend in the age incidence in other countries. The mortality figure had been low—probably below 10%. The symptoms which should suggest an abortive attack in contacts were headache, shivering, malaise, vague body pains, and fever. To all or some of these might be added catarrhal symptoms (sore throat, coryza) or gastro-intestinal symptoms (nausea, vomiting, diarrhoea). Polio-encephalitis had been relatively common earlier in the outbreak. Nystagmus was the commonest sign of polio-encephalitis. An unusual degree of drowsiness and mental confusion was noted in many cases. An extremely rare and unusual type of cerebellar picture had been seen in some cases, consisting of emotional instability, gross ocular tremor, and tremor of the head and limbs. Two unusual findings in the C.S.F. had been noted, together or independently: a relatively normal or normal cell count and a marked increase in the protein content of the fluid. An unusual form of meningo-encephalitis which occurred in 1946, reported by Jennings, and described at this meeting by Laurent, appeared to be identical with polio-encephalitis as seen this year. The virus of poliomyelitis was now the common cause of a meningo-encephalitis and of a benign type of lymphocytic meningitis.

Correspondence

Travel Abroad for Health

SIR,—The approach of winter brings to the fore the question of tuberculous patients in Switzerland. The need for the greatest economy in Swiss francs is obvious, but the means taken to serve this end are open to doubt. In order to obtain an allocation of Swiss currency for treatment purposes the patient has to present to his bank a certificate signed by two doctors stating that unless he goes to Switzerland "his life is endangered." As a result of this wording, advanced cases, which cannot be expected to benefit from any form of treatment anywhere, are easily accepted for treatment, and waste of Swiss francs is almost inevitable. With patients likely to benefit from Alpine treatment the position is more difficult. Some doctors presumably satisfy their consciences with the thought that there is danger to life in any case of tuberculosis not firmly arrested; others, in attempting a more literal interpretation of the regulation, regretfully refuse to give the necessary certificate, because they do not consider their patient's life immediately threatened.

I maintain that this state of affairs is highly unsatisfactory and that some means should be found to lay out our limited currency to better advantage. In general I do not think that the average patient recovers either more rapidly or more certainly in Switzerland than in Great Britain. I have seen no reason to alter this pre-war conclusion in spite of the more plentiful and varied food now obtainable in Swiss resorts. The crux of the problem is that sanatorium vacancies can be obtained much more quickly in Switzerland than in this country, and, so long as this is the case, who can say that a patient's life is not endangered by remaining untreated in this country, however early and slight his lesion may be? So long as our sanatorium waiting-lists are so unwieldy it is to be hoped that the authorities will be as lenient as they can be in granting permits for the utilization of the large reservoir of Swiss sanatorium beds immediately available; but, if the currency is not to be largely wasted, careful selection of patients is necessary.

No good can come from sending advanced cases with much reduced vital capacity; a winter in the Alps cannot be expected to close chronic cavities unsuitable for collapse therapy. Nervous, highly strung patients are liable to respond to altitude by insomnia and tachycardia and may have to be sent home. Chronic bronchitis in the young is usually benefited but in the elderly is more likely to be aggravated by the cold dry air of the Alps. The low barometric pressure is alleged to increase the tendency to haemoptysis, but my own observations do not confirm this belief. Altitude stimulates metabolism, and the patient must have sufficient reserve of energy to respond to the stimulus. Febrile, toxic patients and those of markedly asthenic build usually do better at low altitudes.

Numerous as these contraindications are there remain large numbers of patients, mostly of fairly robust physical and mental constitution, whose progress towards recovery can be expected to be at least as rapid in the Alps as in this country; but climate in itself rarely changes the outcome of the disease. One serious drawback to Alpine treatment is the practice of many Swiss physicians of so frightening British patients regarding the supposed danger of wintering in England that the rehabilitation of many of them as useful citizens has been seriously interfered with.

In present circumstances the best policy would appear to be to select, as far as possible, candidates for Alpine treatment from among those who have already had some months of institutional treatment in this country. Advanced or toxic cases and those likely to require major surgery could in this way be excluded. Each patient sent to Switzerland would free a bed for a more recent case on the waiting-list. Selection of cases on these lines has been practised by the Queen Alexandra Sanatorium Fund during the last two years and has been found considerably to reduce the wastage of money on unsuitable cases. If similar criteria were used on a national scale unfairness would be avoided and considerable waste of precious currency on unsuitable cases would be saved.—I am, etc.,

London, W.1. ANDREW MORLAND.

The Extent of Neurosis

SIR,—This vital and important subject has elicited an interesting correspondence. I venture to say that it can be studied only in relation to fear, its nature, its distribution, and its source. Up to the close of the Victorian era life for the ordinary citizen was a matter of competition. The worker had to find a job and keep it, or face suffering for himself and his family (though not actual starvation). This fear was real and well-nigh universal, but the results of this kind of fear produced the finest kind of work in quality and quantity; and there was little neurosis.

There followed the Socialist outlook which has developed all through the present century. Fear—economic and social—has been gradually eliminated till it matters little to the worker whether he is in work or in benefit. Taking a superficial view this should reduce the extent of neurosis, but on the contrary it has increased enormously. In other words, the elimination of the fear motif has also eliminated the response of effort. Thus we get a situation in which individual effort becomes useless or even detrimental, and economic advancement depends upon an identification of the individual with the group. In other words, a higher standard of living is no longer achieved by an effortful reaction to economic fear and anxiety. Now it is to be obtained by identification with the herd and an attitude of passive solidarity with the group. In other words, the effect of economic stringency is to talk of strikes rather than to concentrate on effort. And no one can blame the individual worker for accepting the change, which has come so gradually and come from his political leaders.

But we are entitled to look ahead and to ask ourselves, "What will be the next phase?" For the sake of argument let us accept the Russian claim that in the U.S.S.R. there is no neurosis. That means that economic anxiety is geared to effort, and if rumour is to be believed it means that the worker gives of his best lest he should find himself in Siberia. Certainly any passive attitude to the group solidarity is not encouraged. There are many other aspects of this question which cannot be discussed within the limits of a letter, but the more we study it the more we are brought back to the essential relationship between fear and effort.—I am, etc.,

Harrow, Middlesex. H. CRICHTON-MILLER.

SIR,—The provocative has its place among the artifices of discussion, but surely it loses its tang when it is employed too bluntly and without nuance. Dr. Arthur Dearlove (Oct. 11, p. 590), describing the inadequacy of the treatment which the neurotics he has referred to psychiatrists have received, declares: "The results are, roughly [sic]: cured, nil; improved, nil."

It is evidently not the intransigence of the neurotics of Dorset he is referring to, as he reflects upon the general impotence of psychiatrists later in his letter. Dr. Dearlove has no doubt acquainted himself with at least some of the numerous follow-up studies which have been published. Is it to be assumed that he meets them not merely with the "retort courteous" but with the "lie circumstantial and the lie direct"?—I am, etc.,

London, W.1. FREDERICK DILLON.

The G.M.C. and Medical Education

SIR,—Mr. A. Wilfrid Adams's letter (Oct. 4, p. 545) was both useful and interesting, but it lands us in a quandary: a student while preparing for his licence to practise must first learn those things that he will want to know when he begins to learn how to conduct general practice; then and only then he has to begin to learn the art of practice. The suggestion of a year with a reputable general practitioner is accompanied by a liability to misuse or indifferent use. The old apprenticeship unfortunately began at the wrong end.

Would it not be more effective to attach a newly passed medico to a health centre, when available? Here he would have the advantage of taking an active part in the general medical practice of his seniors in all the varied services—early diagnosis, observation of conditions not yet labelled, practice in the consulting-room and in the patient's home; here observe the probabilities of treatment being successfully carried out, the need for proper sanitation or prevention; not only these sides of practice, but also work in the hospital to which the centre is attached. In this way he would learn to associate his previous hospital experience with actual practice among patients under conditions new to him. Here, without prejudice, he could observe the results of treatment, immediate and remote.—I am, etc.,

Midford, nr. Bath. CHAS. E. S. FLEMMING.

Mercurial Diuretic

SIR,—I believe "neptal" (mercuric salicyl amino-acetate) is considered the safest and least toxic diuretic of the large group of mercurial diuretics, while it is simple in use since its efficacy does not depend on urinary *p*H. Since, unfortunately, it seems liable to cause prolonged aching pain, however well spread throughout skeletal tissues, probably many employ it—rightly or wrongly—by the intravenous route.

Dr. A. G. Oettlé (Oct. 4, p. 530) sounds a warning note in this connexion. His article interested me very much, since in 1945 I had an unpleasant experience with this drug, which was very probably an acute poisoning of the conducting tissue of the heart and was at all events a near-fatality. I was continuing a series of injections which a middle-aged cardio-renal female patient had received (2 ml. tri-weekly, bi-weekly, and finally weekly) from another practitioner and from which she had derived much benefit. Two injections were wholly uneventful; my third (her 28th or 29th) was almost disastrous, and would certainly have been so if I had not paused to fill the syringe by reflux after 1 ml. had very slowly entered the vein. She complained of such severe faintness and precordial constriction that I stopped the injection. The attack was much as Dr. Oettlé describes, dyspnoea and syncope being followed after a few minutes by an epileptiform convulsion.

I never doubted it was a Stokes-Adams phenomenon until long afterwards. I knew little of the history beyond that the patient was a cardiac case of long standing who had suffered in adolescence from several mild attacks of rheumatism. Two types of Stokes-Adams syndrome are described—a syncopal and an epileptiform. In this patient both appeared to develop successively. Following the attack a severe degree of heart block was sufficiently obvious from the extremely slow pulse with rapid jugular pulsation. An E.C.G. confirmed this and appeared to clinch the diagnosis of Stokes-Adams attack. I was fortunate in that symptomatic treatment carried out in this firm conviction at least did not prevent recovery, but on reflection I feel sure that it was I who accidentally "did the bundle in" and not a senior and most capable colleague who had treated the patient for some time in ignorance of a pre-existing heart block. *Some* Stokes-Adams attack—if it were such.

The most surprising feature of the case was the patient's bravery in submitting later to an apparently similar course of treatment, and one greatly favoured in France though not, I think, in England—i.e., intravenous injections of sterile "novocain" (procaine hydrochloride). The recommended dose of 10 ml. of 1% solution can be much exceeded with apparently complete safety, although large doses cause a transient complaint of paraesthesiae in fingers and other extremities. Very bold doses are given by some French physicians, who employ the drug as an antispasmodic agent in treating a diversity of spastic conditions, ranging from migraine through the asthmas and intestinal spasms to passing calculi (renal and biliary). As an antispasmodic agent I do not suppose novocain is ever likely to supplant atropine or pethidine but it has the merit of instantaneous action, and can be most useful alone or as an adjuvant. It is interesting to watch its action on the *x*-ray screen as regards intestinal spasms, and to employ it to diagnose—e.g., spasmodic dysmenorrhoea from other varieties (it does not, intravenously, appear to act, even briefly, as a general analgesic).

For nephrosis, procaine injections repeated at regular intervals are favoured by French physicians, it seems. The head of a hospital department demonstrated several cases for my benefit. Can anyone with experience of novocain confirm or refute the suggestion that it could replace mercurials? It can only be a palliative, but so are the latter; and, apart from this rare intravenous risk, are they not always dangerous to the old and frail, even intramuscularly? The patient is no doubt very often in a parlous condition before these powerful drugs are resorted to, but these drugs often seem to precipitate renal

failure, and, as the Greeks advised the making of a will before purgation with the hellebore, were it not well to advocate this procedure before diuresis with the mercury ?—I am, etc.,

Stratford-on-Avon. PETER PARRY.

Sympathetic Disorders in Poliomyelitis

SIR,—Following the annotation on "Sympathetic Disorders in Poliomyelitis" (Oct. 11, p. 579) might I make a few observations on muscle pain ? It is a well-known fact that normal muscle, if exercised to excess, becomes painful and tender—presumably a defence mechanism to prevent a repetition of abuse before recovery has taken place. Everyone knows the "first game of the season" stiffness and tenderness, which may be excruciating and persist for several days. To turn to the abnormal : having slept beneath a ship's blower in the Tropics and awoken with a "stiff neck," one's conclusions are as follows. The reaction to the fall in temperature of the exposed part was that of local shivering or fibrillary twitchings of the muscles in question—in this case the trapezius and sternomastoid of the affected side—summating over a prolonged period to produce the same phenomena as of excessive general contraction—i.e., pain and tenderness.

From the electromyographic findings in poliomyelitis can one postulate an initial pathological stimulation from the diseased anterior horn cells invoking the protective mechanism described above ?—I am, etc.,

Twickenham, Middlesex. D. F. REES.

BAL in the Treatment of Gold Dermatitis

SIR,—In view of the articles which appeared in the *Journal* of Oct. 4 concerning the therapeutic uses of British anti-lewisite, the following case report may be of interest.

CASE REPORT

The patient was a woman of 56 who for six months had complained of increasing pain in both wrists, hands, and fingers. A clinical diagnosis of early rheumatoid arthritis was made and intramuscular injections of "myocrisin" were commenced. The E.S.R. had not been done, but the urine had been carefully examined and was repeatedly checked.

A system of increasing dosage at weekly intervals was employed, and at the end of eight weeks a total of 0.4 g. had been given. The day following the last injection an irritating erythema appeared, which quickly changed to a macular rash, and after a week the typical appearances of an exfoliative dermatitis due to gold were evident. The condition was severe and resisted every method of treatment.

After eight weeks of trial and error injections of BAL were commenced. The preparation used was a 5% solution in 10% benzyl benzoate in peanut oil. Daily injections of 2 ml. were given for five days, with immediate amelioration of the symptoms. The dermatitis, however, did not completely disappear, and after a period of four weeks of comparative comfort for the patient the condition recurred. Further daily injections of BAL 2 ml. were given for seven days, and the dermatitis once more subsided, the improvement this time being maintained. The injections produced two large abscesses in the buttocks which had to be drained. The arthritis, which responded well to the gold therapy, has so far showed no signs of recurrence.

—I am, etc.,

Tenbury Wells, Worcs. J. A. BURNETT.

The Weil-Felix-Wilson Reaction

SIR,—What is commonly called the Felix-Weil reaction is in reality the Felix-Weil modification (or variation) of the Wilson typhus reaction, for Wilson's (now Prof. W. James Wilson, of the Queen's University, Belfast) discovery of the agglutination of organisms of the *B. coli* and *Proteus type* was made in 1908 and 1909, whereas it was not until the first world war that Felix and Weil carried out their work, publication regarding which was made in 1916. Personally I have every reason to remember the discovery, as I was the first human being on whom it was tried for diagnostic purposes—in March, 1908.

The following is a brief outline of the genesis : From the end of December, 1906, for several years Belfast was visited by a very severe epidemic of cerebrospinal fever, and a considerable amount of work was carried out at Queen's College (now University) on the bacteriology of the meningococcus. While this epidemic was in progress I happened to be R.M.O. in the City Isolation Hospital at Purdysburn, where in my time (about one year eight months) about 360 cases of the disease were treated (a paper by me describing the outbreak was published in the *Practitioner*, 1915, **94**, 831).

Wilson during this period had been making investigations at Queen's regarding the bacteriology of cerebrospinal fever and had been struck by the heterologous agglutination effect of the blood serum of patients suffering from the disease (see *Journal of Hygiene*, 1909, **9**, 316). While the epidemic was in progress an outbreak of typhus fever occurred in the city, and almost forty of the cases were admitted to Purdysburn during my residence there, and I suggested to Wilson that if he would care to make investigations about the disease I would try and get him as much material as possible. Wilson then started his investigation, and samples of blood, faeces, urine, etc., were taken by us from patients who, we considered, were suffering from undoubted typhus. Wilson found before long, as in cerebrospinal fever, that there were heterologous agglutinations in this disease also. He found that the serum of typhus agglutinated *B. typhosus* and also bacilli obtained from the faeces and urine of typhus patients. Wilson's first publication on this matter appeared in the *Transactions of the Ulster Medical Society*, session 1908-9, in a joint paper by Wilson and myself (but I must state here clearly that it was Wilson who was entirely responsible for the discovery of the agglutination effect).

Near the end of my residence time in the hospital I developed an acute febrile condition which resembled typhus. There was doubt at first, and my serum was tested. An agglutination reaction was found. This condition began very suddenly, without preliminary catarrhal symptoms, and was accompanied by a rash that was a cross between that of measles and typhus. It ended with a sudden drop of temperature on the twelfth day. Wilson's next paper was published in the *Journal of Hygiene*, 1909, **9**, 316. In the *Journal of Hygiene*, 1910, **10**, 155, a further paper entitled "The Etiology of Typhus Fever" was published by him. Among his conclusions are the following :

"(4) From the faeces of one case a variant form of *B. coli communis* was cultivated on which the blood serum of 17 typhus fever cases was found to have three to ten times the agglutinative effect of normal serum.

"(5) From the urine of two cases a bacillus resembling *B. coli communis* but having no action on lactose was cultivated. This bacillus was agglutinated in dilutions of 1:50 and 1:100 by the serum of the cases but not by normal serum."

This bacillus from the urine Wilson regarded later as a urinary variety of *B. proteus* ("The Wilson-Weil-Felix Reaction in Typhus Fever," *Journal of Hygiene*, 1920, **19**, 115), and pointed out that it is probably similar to the X2 strain of *B. proteus* first used by Weil and Felix. Weil and Felix in "X19" obtained a more sensitive organism for the typhus reaction than X2 ; Wilson also, in U2, a bacillus of the colon-paratyphoid group, obtained an organism not only more sensitive than his original one but as sensitive as X19 of Weil and Felix in certain cases of typhus fever. Comparisons are given regarding this in Wilson's paper "A Further Contribution to the Serology of Typhus Fever" (*Journal of Hygiene*, 1927, **26**, 213). This bacillus U2 is named so on account of its similarity to the original U discovered by Wilson in 1908, which was found to be agglutinated by the serum of typhus fever patients with three to ten times the effect of normal serum ("Bacteriological and Cytological Investigations of the Blood in Typhus Fever Cases," by W. J. Wilson and E. H. M. Milligan, *Transactions of the Ulster Medical Society*, Session 1908-9).

It should be remembered that in addition to the Felix-Weil modification of Wilson's typhus reaction there are other modifications such as those using *B. pyocyaneus* (Kreuschen, 1918 : Neukarsch and Kreuschen, 1919 ; Sampietro, 1920 ; Wilson 1922), and the *Coccobacillus byzantinus* (Beguet, 1921).

In view of the above observations I think it will be admitted that it is reasonable and right to suggest that in future the Felix-Weil reaction should be called the Felix-Weil modification of the Wilson typhus reaction, or, more shortly, the Weil-Felix-Wilson reaction (W.-F.-W. reaction). Wilson was undoubtedly its discoverer ; Felix and Weil have the credit of developing it, expanding it, and getting it more widely used during the first world war.—I am, etc.,

Glossop, Derbyshire. E. H. M. MILLIGAN.

Auricular Inflammation

Sir,—I had opportunity to notice during ten years of service in China four cases of a peculiar otochondritis in the cartilage of the external ear, with the signs of acute inflammation, redness, swelling, and localized pain. In such a case the auricula is tender and sometimes shows an oedematous swelling, which subsides on pressure, causing considerable pain. This otochondritis disappears after a few weeks, leaving the auricula enlarged and the cartilage thickened. After some time—weeks or months—the next attack would set in with a very similar course, possibly a bit of fever, and clear up again. After years, as I have seen in one case—a middle-aged woman of Chinese race—the auricula becomes hard as a board, inflexible, and stands at a right angle to the sagittal plane of the body. The skin is dark brown, hyperpigmented, and the patient complained of being unable to lie on the diseased side.

I could not find any cause for this disease. One patient had a positive Kahn test, and antisyphilitic treatment had no influence on the course of the disease. I tried local application of tincture of iodine, cold and hot fomentations, and sulphonamides by mouth, all *sine effectu*. Could somebody enlighten me on this subject or relate similar experiences, especially in tropical countries?—I am, etc.,

London, W.1. W. Winterstein.

Treatment of Varicose Veins

Sir,—The article on the treatment of varicose veins by Prof. A. M. Boyd and Mr. D. J. Robertson (Sept. 20, p. 452) contains points of much practical interest, some of which call for further discussion. The 12 cases of deep thrombosis seen in a space of five months must surprise most of your readers. Many years ago I had one such case in a man of 70 to whom I had given some injections of, I think, quinine below the knee. The following week he reported with his whole saphena vein thrombosed to the groin. He did not turn up again for a few months and then said that in the meantime he had had pneumonia, but my inquiry to his doctor as to whether he thought the "pneumonia" was an embolic condition or whether it was a primary condition which might have caused the deep thrombosis failed to elicit a reply. I have never seen deep thrombosis following groin ligation plus injection. I wish the authors had said more about the technique used in the 12 cases and the amount and nature of solution employed.

The authors repeat the usual statement that it is important to ligate the saphena tributaries in the groin to prevent recurrence and show a photograph to illustrate a recurrence where this has not been done. As it is virtually impossible to get a clear view of the sapheno-femoral junction without dividing these tributaries it is safe to assume in such cases of recurrence that effective ligation has not been done, but the point is academic. The writers refer to temporary oedema of the ankle and lower part of the leg which may follow injections alone. I have had this annoying complication from time to time, but, owing to its transient nature, have wondered whether it might be caused by unduly prolonged reflex spasm spreading to some of the sub-fascial veins. I do not dispute their explanation, however, that it may be due, in part at least, to some degree of thrombosis in the deeper veins.

The authors do not refer to sclerosing agents, but the choice of these is of some importance. Thirteen years ago I started experimenting with carbolic-glycerin mixtures of various strengths, and for the last eight years have used a solution of 2% liquid phenol in 30% glycerin measured by volume. This solution is an adequate sclerosing agent, seldom causes undue reactions, is relatively harmless to the subcutaneous tissues, possibly due to the hygroscopic qualities of the glycerin leading to its dilution with tissue fluids, and is cheap and antiseptic, and can be stored in bulk. Haemoglobinuria has not been reported from its use, though it occurred at times with higher strengths. 15 ml. is the standard amount given at any one sitting, though 20 or 25 ml. has frequently been injected in divided doses. The only disadvantage to report is that vertigo sometimes occurs after injecting 5 ml. at one point, but this passes off in a minute or so, and further injections do not cause a return of the giddiness. A modification of this solution has been reported on by Dodd in this *Journal* (March 15, p. 366).

Another point in treatment I may be allowed to mention here is that the saphena vein may be thrombosed by mechanical damage to the intima. For this purpose a "scraper" is used. This instrument consists of a metal tube (25 in. (63 cm.) is a convenient length) with a screw joint in the middle for ease of portability; and at the end is fixed a metal cylinder with a rounded end and roughened surface, which is passed down the saphena trunk after its division in the groin. The instrument will not pass a marked tortuosity in the vein, but obstructing valve cusps can be broken down safely with a few judicious jabs, and in most cases the roughened cylinder will reach at least as far as the knee, and in large veins can often be pushed its full length to the middle third of the leg. During this proceeding escape of blood is prevented from the upper end of the vein by a piece of catgut passed twice round the vein, the ends being held by an assistant. In the case of the left leg, when the scraper has been passed to its limit with the right hand, the fingers of the left hand are pressed against the vein, with the little finger opposite its lower end, and the scraper is moved up and down a few times and rotated if desired. This procedure is repeated a hand's breadth at a time in an upward direction till the whole length of vein is dealt with. If it is desired to inject the vein at operation, the tube of the instrument is filled with solution to displace air before it is passed, and when it has been pushed down to its limit 10 ml. of the solution mentioned above is injected and the "scraping" then proceeded with.

Boyd and Robertson give evidence to suggest that injection below the knee is unlikely to be harmful, and, as mechanical thrombosis of the trunk above the knee cannot affect the intima of the deeper veins, the technique described appears to meet their criteria of safety in treatment. This may account for the lack of anxiety I have had with the method during the past four to five years.

The instrument is made by Messrs. Phillip Harris and Co., 44, Edmund Street, Birmingham, 3.—I am, etc.,

Birmingham. J. W. Riddoch.

Homosexuals in Prison

Sir,—All workers in this field welcome Dr. F. H. Taylor's article (Oct. 4, p. 525), which puts forward the evidence of facts to take the place of speculation and theory. As he rightly says, it is the true invert whose case is of most interest, and several matters arise from his report of the 13 prisoners of this type who came under his care.

First, the facts refute a popular misconception that the natural homosexual is attracted to small boys, as among 13 true inverts only one was interested in boys. An invert turns towards adults of his own sex as naturally as a normal man is sexually attracted by a woman as a potential mate rather than by a child.[1] Homosexual offences against children are almost exclusively the prerogative of the pseudo-homosexual group, wherein over 50% exhibit mental subnormality, many of them being of the same mental age as the children they seek to seduce.

Secondly, the evidence from the series of true inverts might be used to give support to the theory that seduction in early youth or childhood is a dominant factor in the production of homosexuality, which is the view taken by Sir Norwood East and W. H. Hubert[2] and opposed by E. A. Bennet and others.[3] This point of course is supremely important in connexion with the social as well as the clinical aspects of homosexuality. But the support given by this investigation is considerably weakened by a closer examination of the evidence which Dr. Taylor quite impartially puts forward. Among these 13 men androgynous physique was present in six cases: obviously the physique could not have been caused by the seduction, though the reverse might well have been true. The fallacy of *post hoc ergo propter hoc* can be excluded only by comparable statistics from a control series of non-homosexual prisoners. Some form of homosexual activity which can only be described as seduction is the experience of large numbers of public-school boys during their early 'teens, the incidence varying widely from school to school, but in some places it is certainly of the order of 50%; a similar figure is probable in other social strata, and it may well be even higher among the sub-intellectual group that contributes so largely to the prison population. The postulated connexion between seduction and later homosexuality can therefore be established only if a similar investigation among a control series of prisoners reveals a difference that is statistically significant. It is to be hoped that this evidence will be forthcoming, for without a knowledge of the facts further discussion is useless.

Thirdly, the evidence from Brixton prison appears to support the alleged connexion between natural homosexuality and sexual perversion, which is the view put forward by Sir Norwood East and W. H. Hubert[2] and Clifford Allen,[4] and opposed by Havelock Ellis and others. J. A. Symonds (in an unpublished essay) admits that, although "a far larger proportion of mental disturbance and nervous hypersensitivity can be proved in Urnings than in normal men, in a vast majority of cases the Urning owing to present laws and social prejudices cannot, like other men, obtain a simple and easy satisfaction of his inborn sexual desires, which for him are as natural as swimming to a fish. It is this forcible suppression of an instinct so deeply rooted in his nature which originates the morbid symptoms that may often be observed in the Urning." The same author attributes to homosexual fears and guilt "at least half of the suicides of young men." Bernard Shaw has stated categorically that "homosexuality implies no general depravity whatever."[5] The validity of evidence to the contrary which might be drawn from the present series of cases is dependent entirely upon the support of a series of controls. An examination of the 198 prisoners (presumably males) charged with heterosexual offences during the same period would probably yield a percentage of degeneracy comparable with that found in the homosexual group, and this again is valuable evidence that should be available before discussion can proceed with profit. But in any case it would be as unreasonable to draw conclusions about clinical and social (as distinct from anti-social) homosexuality from a series of homosexual prisoners as to base arguments concerning normal heterosexuality on the findings in a similar group of heterosexual offenders.

General deductions as to treatment would be open to the same error. It would be as unlikely that patients from this series of cases could respond to psychotherapy by making a good social adaptation (even if their homosexuality were left untouched) as that their heterosexual fellow prisoners could be educated to become happy fathers and husbands. Only the dregs of both classes find their way into the prisons, and unfortunately it is only from this group that statistical evidence about homosexuality can be collected. This evidence is not applicable to the socially adapted natural invert.

Lastly, may the opportunity be taken to correct an error that appeared in the *B.M.J.* last year, and which still stands unchallenged, namely—that "buggery" is a scriptural term? The appellation of *bougre* (Fr: Bulgarian) was given to the ultra-puritanical sect of the Albigenses in the South of France during the eleventh century A.D. on account of their association with the Bogomils, or Bulgarian heretics—heretics only by reason of their steadfast and unyielding opposition to Catholic orthodoxy, for which the sect was exterminated in the Albigensian "Crusade" of 1209.[6] The imputation of unnatural vice (which has been entirely discredited) was the invention of the fertile mind of Pope Innocent III, who was himself a repressed homosexual and a fanatical persecutor of all forms of sexual heterodoxy real or imagined.

Cornwall. D. STANLEY-JONES.

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Another Foetus Cries

SIR,—Interest and speculation have been aroused by reading Dr. E. Curphey's letter (Sept. 27, p. 508). During induction of labour on Oct. 8 in a para-2 woman at the 39th week of pregnancy by means of a Drew-Smythe catheter I was astonished to observe the same phenomenon. The head was in the brim of the pelvis. While manipulating the catheter I followed my usual custom of engaging the patient in conversation. On this occasion I was asking her whether she had read in the papers of the baby who cried before being born.

After withdrawing 24 oz. (680 ml.) of liquor I left the catheter *in situ* for another minute in order to remove any further liquor that could be expressed from the uterus. The baby was particularly active and moved the catheter several times. Immediately after withdrawing the catheter the mother said to me, "My baby is crying too." Needless to say I did not believe her and suggested that I had put the idea into her head. Half a minute later I asked the midwife in attendance to listen to the foetal heart. On placing the foetal stethoscope rather nearer the foetal head than usual, she replied excitedly, "The baby *is* crying." At this stage, from my position at the foot of the patient, who was still in the lithotomy position, I heard a sound resembling a smothered gurgle. I then used the foetal stethoscope and without a doubt heard the baby cry.

The baby was subsequently extracted with forceps, alive and well, 15 hours later. I too was unfortunate in not getting further medical confirmation in order to convince my sceptical colleagues, and the baby could not be induced to repeat the performance.

George H. Ryder, however, has reviewed[1] some of the 123 authentic cases of vagitus uterinus reported in the literature between the years 1800 and 1941. He found that there was a foetal mortality of nearly 1 in 5, and in 85% of cases operative interference was required. One cannot, of course, infer that the mortality or the interference was directly related to impending asphyxia of the foetus. Munro Kerr in his textbook[2] has reported that on two occasions he heard the foetus cry *in utero* while an internal version was being performed. It is obvious that the introduction of air into the uterus is necessary before the foetus can cry, and possibly somatic stimulation from the introduced instrument or hand also helps to overcome the inhibition of respiratory movement which Barcroft has found[3] to exist during the latter period of foetal life. In this particular case both conditions seem to have been present.—I am, etc.,

Oxford. JEAN BURTON-BROWN.

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Vaginal Temperature

SIR,—The case reported by Dr. John Hankinson (Oct. 11, p. 574) of a woman having passed a clinical thermometer into the bladder while endeavouring to take her vaginal temperature should serve to emphasize the undesirability of this extraordinary procedure. That the recording of basal temperatures is of great value in the study of cases of infertility will be acknowledged by most of those who have had experience of them and have taken pains to see that their patients record them properly; that the determination of the "safe period" by means of basal temperatures can be a satisfactory contraceptive technique might also be allowed, though doubts might validly be expressed concerning this; but that patients should be subjected to the inconvenience and, to judge from Dr. Hankinson's report, the potential dangers of inserting clinical thermometers into their vaginae in order to estimate their basal temperatures seems utterly ludicrous.

Is the temperature of the vaginal cavity supposed to carry some especially recondite significance from the standpoint of conception, its failure, or its prevention? Or is the placing of a clinical thermometer beneath the tongue, followed by closure of the lips, too simple a procedure sufficiently to impress the patient that the temperature record so obtained is of value? If anyone who has been advising his patients to take their vaginal temperatures does not realize that oral temperatures taken in the same way will yield just as much information, then the best advice that can be given is that he should try the latter technique and see for himself. And the same can be said for rectal temperatures, the taking of which is scarcely less inconvenient or distasteful to the patient than is that of vaginal temperatures.

That the situation as it appears to exist is almost comic can be judged from the suggestion of Dr. Hankinson that a specially designed thermometer should be employed for taking vaginal temperatures, which calls to mind the true instance of a woman, instructed to take her vaginal temperatures, apologizing for not having done so because none of the chemists' shops she had tried had stocked a vaginal thermometer.—I am, etc.,

London, N.W.6. G. I. M. SWYER.

POINTS FROM LETTERS

Pure Anti-E Agglutinin in the Serum of an Rh-negative Woman

Dr. R. H. MALONE (Sheffield) writes: In continuation of my letter . . . (Sept. 13, p. 433), Dr. Mourant has informed me that Mrs. C.'s serum has been re-examined and found quite definitely to contain incomplete anti-D in addition to anti-E. The baby's genotype was R_2r (cDE/cde).

Mind and Matter

Dr. ALEXANDER LEITCH (Westbury-on-Trym, Bristol) writes: Having read with interest Dr. E. R. Banner's speculations on the mind-body relationship (Sept. 13. p. 433), I feel that, while Dr. Banner develops his theory quite logically, the superstructure is based on such a remotely conceivable possibility (or premise)—i.e., "it is not wholly inconceivable that every physical unit (say, every electron and proton) is the body of a very simple mind." It might, in fact, almost be regarded as a *reductio ad absurdum* of the superior theory of Adolf Meyer of "psychobiological integration," which, put very briefly, postulates that, from the simplest beginnings of organic life without any neural structures, through organisms of increasing complexity, first differentiated into oval and caudal parts, on to organisms with rudimentary brains, and so on to man himself with his unique (in the animal world) cerebral development, there appeared at some point in the evolutionary chain a form of consciousness; and as the complexity of the neural structures grew so the attributes of mind increased, so as to adapt and integrate more perfectly the organism with its environment. This process culminates in man, with his uniquely developed cerebral structures on the one hand and his intellectual capacity on the other.

Sacro-iliac Strain

Dr. C. J. PENNY (Winchester) writes: The provision of belts for patients suffering from sacro-iliac strain is a matter of some difficulty in these days. This condition occurs not infrequently during pregnancy, and recently a patient of mine who was proceeding to India shortly came to me for treatment. There was no time to get an appropriate belt, and it occurred to me that a sheet-rubber bandage might give the necessary support. I accordingly applied such a bandage over the underclothing and was pleased to find that the patient's symptoms were completely relieved. Since then I have used the same apparatus in other cases of pregnancy and the patients have found them to be comfortable, easy to apply, and to give them the support necessary to relieve their symptoms. . . .

Manic States in the Far East

Dr. H. HARRIS (Lingfield, Surrey) writes: Dr. R. F. Tredgold in his interesting paper on "Manic States in the Far East" (Oct. 4, p. 522) concludes that they may be due to "the sudden release of tension and the consequent change in the tempo of work." It might be of interest and value to analyse statistically the relative incidence of manic reactions in the general community after V J day.

Poliomyelitis

Dr. R. A. Russell Taylor (Wakefield) writes: On June 1, 1947, Pinderfields Emergency Hospital, with the approval of the Ministry of Health, opened a special department here for the treatment of the after-effects of infantile paralysis. It may be of interest to the medical profession to know that we have to-day admitted for treatment our one-hundredth case. Our youngest case is that of a child of one week old, and we have a patient who is five months' pregnant, also suffering from this condition. . . .

Convalescent Homes

Dr. BARBARA J. HICK (Broadstairs, Kent) writes: I am very glad to read in the annotation (Oct. 11, p. 580) that the Institute of Almoners has undertaken a survey of convalescent homes. After 15 years in practice among both sexes in various parts of the country my impression is that many patients are glad to get back to their own homes and have a rest. I particularly remember a man with valvular disease of the heart who had been given up by another doctor only a few months before. He was the type of case who should have been taught the value of relaxation with a view to a future of curtailed activity, but he returned tired out owing to the amount he had had to do at the convalescent home. Most places have an iniquitous rule that patients are not allowed in their bedrooms between 8 a.m. and 8 p.m. Some allow a rest in the afternoon if ordered by the patient's own doctor, but surely all patients should be able to go and lie down at any time when they feel the need for rest and quiet. About two years before the war I went round a home newly opened for women. There were only two settees in the whole place and they both looked extremely uncomfortable. . . . There is (literally) a crying need for homes for mothers and babies. A few were started in the years between the wars, but the supply is most inadequate.

Obituary

MACGILLIVRAY OF MACGILLIVRAY, M.D., LL.D.

MacGillivray of MacGillivray, twenty-eighth chief of the clan of MacGillivray, died at his home at Crail, Fifeshire, on Oct. 15 at the age of 82. He was for forty-five years surgeon to the Dundee Eye Institution and a former reader in ophthalmology at St. Andrew's University.

Angus MacGillivray was educated at Fordyce Academy and Aberdeen University, where he was an honours graduate in medicine and Struthers' gold medallist in anatomy. After studying at the Birmingham Eye Hospital and later in London, he was appointed assistant ophthalmic surgeon in Aberdeen. He went to Dundee in 1889 and was the first ophthalmic specialist in practice there. He gave many years of devoted service to Dundee Eye Institution, and after his forty-five years as senior surgeon he was appointed honorary consulting surgeon and director of the Institution. He also founded the department of ophthalmology at Dundee Infirmary and was surgeon there for over thirty years before becoming honorary consultant ophthalmic surgeon in 1925. It was not until 1935 that he retired from the post of reader of ophthalmology at the University of St. Andrew, and in 1937 he received the honorary degree of LL.D. He acted as eye specialist to the education authorities of Dundee, Angus, and Fife, and during the 1914-18 war he was consulting ophthalmic surgeon for the Dundee area. Later he became registrar of Dundee Military Hospital, was promoted major, and received the Territorial Decoration. About 1939 he gave up many of his activities and went to reside at Crail.

A keen Celtic student and archaeologist, he was Chief of the Dundee Highland Society in 1912, and was the author of *Our Gaelic Proverbs: A Mirror of the Past*, and also *The Highland Dress*. He published in 1916 a book on the bacteriology and clinical study of the eye and contributed a number of papers to the medical press. He was secretary of the Section of Ophthalmology at the Annual Meeting of the B.M.A. in 1898 and vice-president at the 1902 meeting. He was also president of the Dundee branch in 1924–5. From 1926 to 1939 he was county controller and county director of the Dundee branch of the British Red Cross Society, and he was a Commander of the Grand Priory in the British Realm of the Order of St. John of Jerusalem. He was at other times president of the Forfarshire Medical Association and of the Caledonian Medical Society.

He was twice married, and is survived by Mrs. MacGillivray and two sons, Angus Robertson, the heir, who was born in 1892, and Dr. Allister M. MacGillivray, ophthalmic surgeon in Dundee.

ALEXANDER THOMAS CAMERON, professor of biochemistry in Manitoba University since the close of the 1914–18 war, died in the Winnipeg General Hospital on Sept. 25 after a long illness. He was born in London and was educated at Edinburgh University, where he received his M.A., B.Sc., and D.Sc. He was also awarded the 1851 Exhibition Science Research scholarship while studying at University College under Sir William Ramsay. Later he worked at the Polytechnic Institute, Karlsruhe, Germany. In 1909 he settled in Winnipeg, being appointed lecturer in physiology and biochemistry under the late Prof. Swale Vincent. During the war he served overseas for four years with the R.A.M.C. On his return to Canada in 1919 he became professor of biochemistry and was soon recognized as one of the foremost authorities in that subject. In 1928 he wrote his *Textbook of Biochemistry*; in 1930, in collaboration with Dr. Frank D. White, *Practical Biochemistry*; in 1933, with Dr. C. R. Gilmour, *The Biochemistry of Medicine*; and in the same year *Recent Advances in Endocrinology*, which latter work has gone through six editions. His time was not entirely spent in teaching and writing. He did much research work in marine biology and became chairman of the Fisheries Board of Canada. For his services in this connexion he was recently honoured by the award of the C.M.G. He was an active member of the Scientific Club of Winnipeg; a fellow of the Royal Society of Canada, of the Royal Institute of Chemistry, Great Britain, of the Chemical Institute of Canada; and he was also a member of the Senate of the University of Manitoba. He is survived by his widow, a son and daughter, and one brother living in Montreal.—R. M.

Dr. Lee Choo Neo, of Singapore, died on Sept. 7. Dr. Lee Choo Neo was for many years honorary treasurer of the Malaya Branch of the B.M.A., and vacated that post less than a year ago to take a vacation in Australia. She was responsible for the preservation of the local B.M.A. records during the war period, and the Association owes her a debt of gratitude. Dr. Lee, it is understood, had only recently returned from Australia to resume her private practice. She was the wife of Mr. Teo Koon Lim, and they had one son and two daughters.

Dr. Thomas Henry Harker, who had been associated with Southport Infirmary for many years, died there on Oct. 4 at the age of 68. A native of Hampshire, Dr. Harker was a student of St. Bartholomew's Hospital. He qualified in 1903, graduated M.B. in the same year, and proceeded M.D. in 1905. Dr. Harker was at one time house-physician at the Brompton Hospital and resident surgical officer to the Children's Hospital, Birmingham, and to the Women's Hospital at Brighton. He served in the R.A.M.C. with the rank of captain in the 1914–18 war. He had settled in Southport in 1912, and he was appointed honorary assistant physician to the Infirmary there in 1920, honorary physician eleven years later, and consultant physician in 1938. He was also consulting physician to the Southport Convalescent Hospital. Not long ago Dr. Harker was appointed a member of the Liverpool Regional Hospitals Board, and he had been for many years a member, and formerly president, of the Southport Medical Society. He was chairman of the Southport Division of the B.M.A. in 1934–5. His chief hobby was gardening, and he was particularly expert in the cultivation of dahlias. At all times, however, his chief interest was in the Southport General Infirmary. He had been chairman of the board of management since 1940, and he attended a board meeting there as recently as Sept. 27. He leaves a widow, a son, and two daughters.

Mr. R. R. M. Porter writes: The sudden death of Dr. T. H. Harker so soon after his retirement from practice came as a shock to his many friends in Southport, and particularly to his colleagues on the staff of the Southport Infirmary. Harker was one of those rather rare members of the profession who combine high professional skill and sound clinical judgment with exceptional administrative ability. He was never obtrusive, but when he spoke on a subject he had considered it from every angle and had every relevant fact available, and his views were always sound, never partisan. He will be greatly missed by his colleagues. His whole life was devoted to his work, and his conduct was an example of the highest professional ethics, of calm competence, and of perfect courtesy at all times.

Dr. John Goff, who died in London recently, graduated at Glasgow in 1882, and proceeded M.D. two years later after studying in Berlin, Vienna, and Paris. He was house-physician at the Western Infirmary, house-surgeon to the Dispensary for Skin Diseases, Glasgow, and later assistant master of the Rotunda Hospital, Dublin.

J. D. S. writes: The late John Goff was a remarkable man in many ways. My own intimate personal friendship with him began in 1924, when he was in general practice in Windlesham, Surrey, and lasted until he died. He was the very best type of practitioner, and was much loved by his patients, rich and poor. His life was devoted to his work, which was marked by great sympathy and much understanding. He was in the truest sense a good man, and will long be remembered by his patients and his friends. He was one of the oldest members of the British Medical Association, and was a regular attendant at both local and headquarters meetings. He had interests in golf and racing. A yearly visit to St. Andrew's was a regular habit, and he was rarely absent from an Ascot meeting. Up to last year he was walking five or six miles a day, and enthusiastically carried on his beloved church activities. His life was full and satisfying, and he had no regrets.

Dr. Hugh Nash Bradbrooke died suddenly at his home in Horsham on Oct. 5 at the age of 47. He was educated at the Grammar School, Bletchley, and at Queen's College, Oxford, where he gained first-class honours in natural science. At the London Hospital he won the Anderson Prize in clinical medicine and the Letheby Prize in chemical pathology. He took the B.M., B.Ch. in 1925, the M.R.C.P. in 1927, and proceeded D.M. in 1934, taking the D.P.M. four years later. After holding a series of resident appointments at the London Hospital he went into practice at Abingdon, remaining there for eleven years. He took a keen interest in the affairs of the town, and served as a justice of the peace. He also played an active part in the work of the British Medical Association, and was a representative at the annual meetings on four occasions. He was appointed assistant medical officer to the Oxford City and County Hospital at Littlemore, and clinical assistant to the department for nervous disorders at the Radcliffe Infirmary in 1938. The following year he went to Cliftonville. In 1940 he moved to Horsham, where he was in practice for two years. In 1942 he joined the R.A.F. as a specialist in neuropsychiatry, being invalided out in 1944. Since leaving the R.A.F. he had been honorary psychiatrist at the Prince of Wales General Hospital at Tottenham, neuropsychiatric specialist at the Ministry of Pensions, and clinical assistant in the department of psychiatric medicine at the Middlesex Hospital. Dr. Bradbrooke was keenly interested in aviation. As a pilot in the R.F.C. he saw service in France and Russia. Later he continued to keep up his interest in flying as a member of a gliding club, doing a considerable amount of experimental work himself. During the early part of the recent war he did invaluable work as the first commandant of the Horsham Air Training Corps. He was particularly successful in managing to inspire the greatest keenness and enthusiasm among the boys he trained. For the past two years he had suffered from increasing ill-health, and only those who knew him well could appreciate and admire the effort he made to carry on. He was loyal, sincere, and a very pleasant colleague. He will be greatly missed by all who had the privilege of knowing him. He leaves a widow and three children.—G. S. M.

Medico-Legal

DUODENAL ULCER AS AN INJURY

[From Our Medico-Legal Correspondent]

The original Workmen's Compensation Act, introduced at the beginning of the century, provided compensation for workmen who suffered injury by accident. The courts have always taken the view that the workman ought to benefit by these Acts whenever a beneficial interpretation is possible, and quite early in their history the House of Lords decided that anthrax could be an injury by accident.[1] Since then many diseases have ranked as injury by accident, including a number which are not caused by infection, such as heat-stroke and Raynaud's disease. The courts have tended to reject need for proof of the occurrence of the mishap at any particular time, and to agree that an injury by accident may be caused by a continuous and cumulative process. The door to the admission of disease as an injury at work is opened still wider in the police pension cases, in which the concept of accident does not enter, as the applicant is only obliged to prove injury suffered in the execution of his duty.

In the latest of these[2] a Huddersfield officer, who had always showed exceptional devotion to duty, had for some months before the outbreak of the war been exposed to very long hours of duty and exceptional worry, with the result that he had irregular hours for meals and rest and eventually developed a duodenal ulcer; after unsuccessful medical treatment he had a partial gastrectomy. He applied for a special pension under the Police Pensions Act, 1921, on the ground that his state of health was brought about by his police service. The police authority regretfully decided that they had no legal power to grant him a pension, but the recorder allowed his appeal. The question came before the High Court, which confirmed the award. By an earlier decision of the same court, noted in these columns,[3] a constable was awarded a pension on showing that he had contracted tuberculosis attributable to his service.[4]

They considered that they ought to follow that decision, and that it applied to the present case. The fact that duodenal ulcer is not due to an infection they did not consider to be relevant. If, Lord Goddard said, the condition from which the man suffers is directly and causally connected with his service as a police officer, then he has received an injury in the execution of his duty. Whether if the case had been brought under the Workmen's Compensation Acts the ulcer would have been regarded as an injury by accident is a different question.

[1] *Brintons* v. *Turvey*, 1905, A.C., 230.
[2] *Huddersfield Police Authority* v. *Watson*, 1947 2 All E.R. 193.
[3] *British Medical Journal*, 1944, **1**, 760.
[4] *Garvin* v. *City of London Police Authority*, 1944, K.B., 358.

Universities and Colleges

UNIVERSITY OF LONDON

Foundation Day will be celebrated on Thursday, Nov. 27, and the celebrations will take the form of a dinner followed by a ceremony for the conferment of honorary degrees and a reception.

The Royal Dental Hospital of London, School of Dental Surgery, has been continued as a school of the University until the end of the session 1947–8.

The Semon Lecture for 1947, entitled "The Applied Anatomy and Physiology of the Pharynx and Oesophagus," will be delivered in the lecture hall of the Royal Society of Medicine (1, Wimpole Street, W.) by Mr. E. D. D. Davis on Thursday, Nov. 6, at 5 p.m. The Lecture is addressed to students of the University and to others interested in the subject. Admission is free, without ticket.

The British Postgraduate Medical School has been continued as a school of the University until the end of the session 1947–8, or until the British Postgraduate Medical Federation is constituted as a school of the University, whichever period is shorter.

Percy Cyril Claude Garnham, M.D., has been appointed to the Readership in Medical Parasitology tenable at the London School of Hygiene and Tropical Medicine, from Oct. 1.

The following have been recognized as teachers of the University in the subjects indicated in parentheses: *London Hospital Medical College:* Mr. R. H. Dobbs, M.D., F.R.C.S. (Children's Diseases); Mr. J. W. S. H. Lindahl, M.Ch., F.R.C.S. (Oto-Rhino-Laryngology). *Guy's Hospital Medical School:* Dr. C. Hardwick (Medicine). *Middlesex Hospital Medical School:* Mr. A. J. B. Goldsmith, F.R.C.S. (Ophthalmology); Mr. C. J. B. Murray (Surgery). *St. Mary's Hospital Medical School:* Dr. W. H. Hughes (Pathology (Bacteriology and Immunology)). *University College Hospital Medical School:* Mr. D. N. Matthews, M.Ch., F.R.C.S. (Surgery); Miss Winifred J. Wadge, F.R.C.S. (Oto-Rhino-Laryngology). *King's College Hospital Medical School:* Dr. V. F. Hall (Anaesthetics); Dr. H. A. Magnus (Pathology); Mr. N. S. G. D. Buxton, F.R.C.S., and Mr. H. L. C. Wood, M.S. (Orthopaedics, in addition to Surgery).

John Duncan MacLennan, M.B.E., M.D., has been awarded an I.C.I. Research Fellowship of the value of £600 per annum and tenable in the first instance for three years for research at the British Postgraduate Medical School on the toxaemia of gas gangrene.

UNIVERSITY OF LEEDS

Among the recently appointed members of the staff of the Faculty of Medicine the following have taken up their appointments at the beginning of the present session: I. G. Davies, M.D., M.R.C.P., D.P.H., as Professor of Public Health; C. W. Dixon, M.D., D.L.O., D.C.H., D.P.H., as Lecturer and Chief Assistant in Public Health; T. A. Divine, M.B., Ch.B., as Senior Administrative Officer, School of Medicine; R. P. Harboard, M.D., D.A., as Reader in Anaesthetics; Harold Petty, F.R.C.S., as Research Fellow in the Surgery of Rheumatism; C. J. Polson, M.D., F.R.C.P., as Professor of Forensic Medicine.

R. Orton, M.D., D.P.M., who has been appointed Senior Lecturer in Psychiatry, will take up his duties before the end of the year. Other appointments are announced as follows: W. J. Allen, M.D., Lecturer in Physiology; D. E. Price, M.B., B.S., Lecturer in Forensic Medicine.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

At a quarterly meeting of the Council of the College held on Oct. 9, with Sir Alfred Webb-Johnson, Bt., President, in the chair, Mr. J. M. Wyatt was co-opted to the Council as a representative of gynaecology and obstetrics and was also appointed to represent the College on the Central Midwives Board.

The Hallett Prize was presented to Dr. Nanalal Jivan Shah (Guy's Hospital Medical School). Mr. Alexander Livingston (Epsom College) was admitted as a Macloghlin Scholar. The award of the Blane Medal to Surgeon Commander G. H. G. Southwell-Sander, R.N., was announced.

The President reported a gift of £105 to the Restoration Fund from Dr. Frank Lahey and gifts of silver from Profs. R. V. Bradlaw and H. Stobie in connexion with the inauguration of the Faculty of Dental Surgery.

The general annual report and the annual scientific report of the College were approved.

The following hospitals were recognized in respect of the resident surgical posts required of candidates for the Final Fellowship Examination: Ashford County Hospital, three resident junior house-surgeons and three surgical registrars for a period of one year; Luton and Dunstable Hospital, resident surgical officer and senior house-surgeon for one year; Hope Hospital, Salford, assistant resident surgical officer, assistant medical officer in the department of general surgery, and assistant medical officer of the orthopaedic department; Worcester Royal Infirmary, resident surgical officer and two house-surgeons; Royal Northern Hospital, Inverness, first and second house-surgeons for a further year.

A Diploma in Laryngology and Otology was granted to B. Cohen and a Diploma in Ophthalmic Medicine and Surgery to J. McClement, both jointly with the Royal College of Physicians of London.

ROYAL COLLEGE OF SURGEONS IN IRELAND

The following have received the Fellowship: D. Boland, D. M. Brooks, J. Bunting, R. A. E. Magee, E. O'Malley, W. J. O'Regan, A. B. Walsh, F. H. Counihan.

Medical News

Invalids' Milk Cut

Invalids' priority allowances have been reduced by two-sevenths, so that those entitled to 14 pints of milk weekly receive only 10. The priority allowance of 7 pints weekly for children aged 1 to 5 is reduced to 6 pints. The Ministry of Food attributes the necessity for this to the severity of last winter and the dry summer that followed it. For the first nine months of this year, as compared with last year, the loss amounted to 30 million gallons, and it has been impossible to build up adequate stocks of milk foods for babies.

Scientific Films

A congress held in Paris on Oct. 2–9 by the Scientific Film Association and the Institut de Cinématographie Scientifique decided to form forthwith an International Scientific Film Association. The Association will be concerned with all aspects of scientific films and an information bureau will shortly be established in Paris. The congress next year will be held in Britain in October. A provisional constitution for this organization has been agreed by delegates from France, Great Britain, South Africa, New Zealand, Canada, Australia, Malaya, Netherlands, Belgium, Switzerland, Poland, Yugoslavia, Czechoslovakia, Luxemburg, Monaco, Austria, Brazil, Peru, Mexico, China, Denmark, and Ecuador.

Road Accidents

A War Office inquiry into road accidents involving Servicemen found that 40% occurred on straight roads away from a junction. An investigation into accident proneness, as suggested by the Committee on Road Safety in their Report, referred to in our leading article last week (p. 618), is being carried out by the Department of Scientific and Industrial Research. One-third of all the accidents investigated occurred when one vehicle was overtaking another, moving or stationary, and a stationary vehicle was involved in 20% of the cases.

Infantile Paralysis

The disease was first described in 1789 by Underwood, a London physician, said Prof. H. J. Seddon, speaking on infantile paralysis at the Royal Institute of Public Health and Hygiene on Oct. 15. The first recorded epidemic occurred in St. Helena early in the 19th century. He compared the present epidemic with road accidents, most of which were preventable, and said that it was almost trivial in the amount of incapacity that it had caused. Some of the handicaps in the investigation of the disease were the expense and difficulty in using monkeys as experimental animals, the unsuitability of rodents generally, and the absence of any diagnostic test for the presence of the virus or the disease itself. This was the time of year when fresh fruit and vegetables were consumed in the greatest quantity, yet it had not been possible to demonstrate any definite connexion between this seasonal change in diet and the incidence of the disease. The relative immunity of adults was due to the fact that, without knowing it, they had already had a mild non-paralytic attack of the disease. There were two important general preventive measures: the avoidance of physical strain and of overcrowding. There was no specific remedy for the established disease; the results of serum treatment had been equivocal, and none of the new chemotherapeutic agents had proved effective.

Bisset Hawkins Medal

The Bisset Hawkins Medal was presented to Dr. C. H. Andrewes at the Royal College of Physicians on Oct. 18 for his research into typhus and influenza.

Dr. Kenneth Cowan

For health reasons Dr. Kenneth Cowan is not taking up his appointment as Senior Administrative Medical Officer to the South-west Metropolitan Regional Hospital Board, which was announced in the *Journal* of Oct. 11 (p. 597). He will remain as county medical officer of health for Gloucestershire.

Medical Benefit Society

The thirty-ninth Annual Meeting of the Medical Benefit Society for the East and North Ridings of the County of York (including the City of York) was held by courtesy of the York Medical Society in their library at York on Sept. 23, Dr. Ritchie Rodger, J.P., presiding. After approving the minutes of the Annual Meeting of 1946 the Annual Report for the year 1946–7, including that of the Hon. Treasurer, was received and adopted. From the latter it appeared that £107 5s. had been granted in relief. With a current balance of £362 the financial position was considered very satisfactory. The officers elected for the coming year were Mr. R. B. Blair (Hull) as President, Dr. G. F. Longbottom (Middlesbrough) as Vice-President, Dr. M. Jacobs as Hon. Secretary, Dr. N. T. Whitehead as Hon. Treasurer, with Messrs. Harold Locking and Co. as auditors. Nine new members were elected. There were no further applications for relief.

Highway First Aid

The July number of the British Red Cross Society's *News Survey* reviews Red Cross activities throughout the world and records a speech by Air Marshal Sir Harold Whittingham, the Society's medical adviser, on first-aid services on the highway. He made the interesting point that first-aid posts should be transportable, because the danger spot of to-day might cease to be one in a year or so, owing to road improvements. The sentry-box was the most suitable type of first-aid post on account of its portability and relatively low cost.

Wills

Dr. Arthur Whitfield, formerly professor of dermatology in King's College, London, left £48,576. Dr. Arthur Frederick Bernard Shaw, formerly professor of pathology at the University of Durham, left £12,600. Mr. William Gough, formerly professor of gynaecology at the University of Leeds, left £42,236. Mr. Cecil Banting, M.S., F.R.C.S., of Thanet, Kent, formerly an underwriting member of Lloyd's, left £186,971. Mrs. Ellen Matilda Cooper, of Birchington-on-Sea, who died on April 17, aged 99, widow of Dr. James Cooper, left £109,052, and bequeathed £10,000 to St. Bartholomew's Hospital to found research scholarships. Dr. Samuel Allan Shiach, of Elgin, chairman and managing director of Macallan Glenlivet, Ltd., owners of Macallan Distillery, Speyside, left £87,176.

COMING EVENTS

Discovery of Chloroform Anaesthesia

The centenary of Sir James Young Simpson's discovery of chloroform anaesthesia will be celebrated at Edinburgh on Nov. 4. Prof. R. R. Macintosh, Dr. D. S. Middleton, and Dr. John Gillies will read papers on the use of chloroform at present, at a meeting to be held at 9.30 a.m. in the Lecture Room of the Surgery Department, University New Buildings, Teviot Place. At 12 noon in the Upper Library, Old College, the honorary degree of Doctor of Laws will be conferred on Dr. H. W. Featherstone, O.B.E., and Mr. T. B. Simpson, K.C. After lunch at 12.45 in the Senate Hall, Old College, a reception will be held at 3.30 in the Upper Library, and at 3.45 Dr. Douglas Guthrie will deliver an address. Tea is at 4 o'clock. A display of relics will be on view in the Upper Library from Nov. 3 to Nov. 7.

Middlesex County Medical Society

The next general meeting of the Middlesex County Medical Society will be held at West Middlesex County Hospital, Isleworth, on Tuesday, Oct. 28, at 3 p.m., when there will be clinical demonstrations of surgical, medical, obstetrical, etc., cases.

Society of Chemical Industry

A meeting of the Nutrition Panel of the Food Group of the Society of Chemical Industry will be held at the Chemical Society's rooms (Burlington House, Piccadilly, London, W.) on Wednesday, Oct. 29, at 6.30 p.m., when a paper on "Food and Cancer" will be presented by Prof. A. Haddow and Dr. L. A. Elson. All members of the Food Group are invited to attend the meeting and members may introduce friends in person.

Care of Old People

The Bristol Council of Social Service and the Bristol and District Divisional Hospitals Council have arranged a conference on the Care of Old People to be held on Wednesday, Oct. 29, from 2.30 p.m. to 5.15 p.m. in the Reception Room at the University of Bristol. Drs. E. L. Sturdee and Marjory Warren will speak on "Medical Needs," and Miss D. Ramsey, M.A., Secretary to the National Old People's Welfare Committee of the National Council of Social Service, will speak on the "Social Needs." After a discussion there will be a summing-up by Dr. R. H. Parry.

Central Council for the Care of Cripples

A general meeting of the Central Council for the Care of Cripples will be held on Friday, Oct. 31, at 2.30 p.m., in the Lecture Theatre of the London School of Hygiene and Tropical Medicine, Keppel Street, W.C., when Dr. Charles Hill will address the meeting. The Earl of Dudley, *M.C.*, will be in the chair.

Royal Dental Hospital of London

The annual clinical "At Home" of the Royal Dental Hospital of London School of Dental Surgery (University of London) will be held at the hospital, 32, Leicester Square, W.C., on Saturday, Nov. 22, from 9.30 a.m. to 5 p.m. The annual dinner will not be held this year.

Refresher Courses in Tuberculosis

The Northern Ireland Branch of the National Association for the Prevention of Tuberculosis will hold two refresher courses as follows: (1) "Recent Advances in Tuberculosis," for tuberculosis officers and medical practitioners (fee, 3 gns.; fourth and final year medical students free), to be held at the Midwifery Theatre, Queen's University, Belfast, on Nov. 26–29. (2) "The New Administrative Approach to Tuberculosis," for health visitors, almoners, and social workers (fee, 10s.), to be held at Bryson House, Bedford Street, Belfast, on Nov. 27–29.

Clinical Biology at Paris

The French Society of Clinical Biology will hold the first International Congress of Clinical Biology at Paris on Nov. 20–22 under the presidency of Prof. Polonovski. Persons interested in medical biology are invited to participate. The subscription is 300 francs, and those who wish to attend a banquet being held on Nov. 21 are required to pay an additional 900 francs. Particulars may be obtained from the Secretary General, Dr. Durupt, 20, rue de la Pompe, Paris.

William Blair-Bell Memorial Lectures

The Royal College of Obstetricians and Gynaecologists (58, Queen Anne Street, London, W.) announces that the William Blair-Bell Memorial Lectures for 1947 will be delivered in the College House on Nov. 14, at 5 p.m., and on Jan. 23, 1948, at 5 p.m. The first lecture will be delivered by Dr. D. J. MacRae, on "Heart Disease in Pregnancy," and the second lecture by Dr. Stanley A. Way on "Primary Carcinoma of the Vagina." All medical practitioners interested in the subjects are invited to attend the lectures, but admission is by ticket only, obtainable from the secretary. Tickets will be allotted in order of application, and applicants are asked to indicate for which lecture tickets are required.

Harben Lectures

Prof. Edgar D. Adrian, O.M., F.R.S., M.D., F.R.C.P., professor of physiology, Trinity College, Cambridge, has accepted the invitation of the Royal Institute of Public Health and Hygiene to be the Harben Lecturer for 1947. His subject is "The Organization of the Nervous System" and the lectures will be delivered at the Institute (28, Portland Place, London, W.) on Monday, Tuesday, and Wednesday, Dec. 8, 9, and 10, at 3 p.m. each day. Admission is free, without ticket. Seats may be reserved upon application to the secretary of the Institute.

SOCIETIES AND LECTURES

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.—Arnott Demonstrations by Mr. H. F. Lunn, Monday, Oct. 27, 5 p.m. The Applied Anatomy of Testicular Descent; Tuesday, Oct. 28, 5 p.m. The Cerebral Cortex and the Status of Man; Wednesday, Oct. 29, 5 p.m. Moynihan Lecture by Mr. W. R. Douglas: The Surgical Treatment of Metastatic Carcinoma of the Cervical Glands; Thursday, Oct. 30, 5 p.m. Imperial Cancer Research Fund Lecture by Dr. James Craigie: Viruses, Self-reproducing Substances and Tumours.

ROYAL SOCIETY OF MEDICINE

Section of Odontology.—Monday, Oct. 27, 5.30 p.m. Presidential Address by Prof. H. Humphreys: Dental Education.

Section of Medicine.—Tuesday, Oct. 28, 8 p.m. Discussion: Chemotherapy in Malignant Diseases. Openers: Prof. A. Haddow, Drs. Edith Paterson, E. Boyland, J. F. Wilkinson, Jean M. Watkinson, O. H. Warwick, and Mr. E. W. Riches.

BIOCHEMICAL SOCIETY.—At St. Thomas's Hospital Medical School, Albert Embankment, Westminster Bridge, London, S.E., Friday, Oct. 31, 2.15 p.m. Communications and Demonstrations.

BRITISH INSTITUTE OF PHILOSOPHY.—At University Hall, 14, Gordon Square, London, W.C., Friday, Oct. 31, 5.15 p.m. Mr. W. J. H. Sprott: Psychology and the Moral Problems of Our Time.

DEWSBURY: STAINCLIFFE COUNTY HOSPITAL.—Thursday, Oct. 30, 8 p.m. Mr. W. R. Henderson: Some Aspects of Neurological Surgery.

LEEDS AND WEST RIDING MEDICO-CHIRURGICAL SOCIETY.—At Leeds General Infirmary, Friday, Oct. 31, 8.30 p.m. Sir Archibald McIndoe: Surgery of the Burnt Hand.

LONDON: UNIVERSITY COLLEGE, Gower Street, W.C.—Tuesday, Oct. 28, 5.15 p.m. Dr. Bernard Katz: Physical and Chemical Signs of Nerve Activity; Wednesday, Oct. 29, 5 p.m. Dr. M. H. Pirenne: Physiological Mechanisms of Vision.

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, Cavendish Square, W.—Monday, Oct. 27, 8.30 p.m. Discussion: Treatment of Peptic Ulcer. To be introduced by Dr. A. H. Douthwaite and Mr. Norman Tanner.

PADDINGTON MEDICAL SOCIETY.—At St. Mary's Hospital, Paddington, W., Tuesday, Oct. 28, 9 p.m. Film on the treatment of varicose conditions and their complications, to be introduced by Mr. A. Dickson Wright. All medical practitioners are invited to attend the meeting.

ROYAL INSTITUTE OF PUBLIC HEALTH AND HYGIENE, 28, Portland Place, W.—Wednesday, Oct. 29, 3.30 p.m. Dr. W. G. S. Pepper: The Doctor in Industry (illustrated).

ROYAL MEDICAL SOCIETY, 7, Melbourne Place, Edinburgh.—Friday, Oct. 31, 8 p.m. Address by Prof. W. E. Le Gros Clark: The Role of the Anatomist in the Study of Sensory Functions.

SOCIALIST MEDICAL ASSOCIATION.—At Denison House, 296, Vauxhall Bridge Road, S.W., Friday, Oct. 31, 7.30 p.m. Dr. J. E. McCartney: Some Impressions of American Laboratories (illustrated).

POSTGRADUATE DIARY

EDINBURGH POSTGRADUATE BOARD FOR MEDICINE.—At West Medical Lecture Theatre, Edinburgh Royal Infirmary, Tuesday, Oct. 28, 5 p.m. Mr. J. M. Graham: Obstructive Dyspnoea.

EDINBURGH ROYAL INFIRMARY.—Thursday, Oct. 30, 4.30 p.m. Honyman Gillespie Lecture by Dr. W. Ritchie Russell: Traumatic Amnesia.

INSTITUTE OF DERMATOLOGY, 5, Lisle Street, Leicester Square, W.C.—Tuesday, Oct. 28, 5 p.m. Dr. Muende: Pathological Demonstrations. Thursday, Oct. 30, 5 p.m. Dr. H. MacCormac: Occupational Dermatitis.

INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330–2, Gray's Inn Road, London, W.C.—Tuesday, Oct. 28, 4.30 p.m. Mr. Terence Cawthorne: Surgical Treatment of Deafness.

LONDON CHEST HOSPITAL, Victoria Park, E.—Friday, Oct. 31, 5 p.m. Dr. N. Lloyd Rusby: Recent Advances in the Diagnosis of Pulmonary Tuberculosis.

The Royal College of Obstetricians and Gynaecologists (58, Queen Anne Street, London, W.) has arranged a postgraduate course of advanced lectures for those studying the special practice of obstetrics and gynaecology to be given in the College House from Monday, Nov. 17, to Friday, Nov. 21, at 5 p.m., both dates inclusive. The fee for the course is £2 2s. (10s. 6d. for a single lecture). A small number of tickets will be available free of charge to Fellows and Members of the College and will be allotted in order of application. There will be no admission without tickets, which are obtainable from the secretary.

APPOINTMENTS

As a result of a reallocation of duties, the Secretary of State for Scotland has appointed Mr. N. D. Walker of the Department of Health for Scotland to be a member of the Central Midwives Board for Scotland in place of Mr. T. A. Greig of that department.

Prof. F. E. Tylecote, M.D., F.R.C.P., J.P., has been elected a member of the Central Midwives Board, on the nomination of the Association of Municipal Corporations.

Sir Alexander Macgregor, M.D., LL.D., has accepted the Secretary of State for Scotland's invitation to become chairman of the Western Regional Hospital Board in place of Prof. E. P. Cathcart, M.D., F.R.S., who asked to be relieved of the appointment on account of ill health.

Sir Alexander Macgregor was medical officer of health for the City of Glasgow from 1925 until his retirement in 1946. He is at present chairman of the Scientific Advisory Committee.

James Barclay Ewen, M.D., D.P.H., has been appointed Senior Administrative Medical Officer of the East Anglian Regional Hospital Board.

Dr. Ewen is Principal Assistant Medical Officer (Hospitals Section) of the Middlesex County Council.

William Alexander Ramsay, M.D., has been appointed Senior Administrative Medical Officer to the Sheffield Regional Hospital Board.

For the past fourteen years Dr. Ramsay has been medical superintendent of Crumpsall Hospital, Manchester.

Charles Lindsay Elder, M.B., Ch.B., D.P.H., has been appointed Medical Officer of Health for Middlesbrough.

BUCKLEY, WILLIAM, M.A., M.B., B.Chir., F.R.C.S., Assistant Thoracic Surgeon, Nottinghamshire County Council and Nottingham City Council.

CANADIAN RED CROSS MEMORIAL HOSPITAL, Taplow, Maidenhead, Berks.—*Director of Research Unit (Juvenile Rheumatism)*: Eric Bywaters, M.B., M.R.C.P. *Director of Department of Pathology*: L. E. Glynn, M.D., M.R.C.P.

JOHNSON, H. D., M.B., B.Ch., F.R.C.S., Honorary Assistant Surgeon, Royal Free Hospital, Gray's Inn Road, London, W.C.

NEWBOLD, J. C., M.A., M.B., B.Chir., F.R.C.S., M.R.C.O.G., Honorary Assistant Obstetrician and Gynaecologist, Royal Hospital, Wolverhampton.

BIRTHS, MARRIAGES, AND DEATHS

BIRTHS

BARTON.—On Oct. 4, 1947, at Musgrove Park, Taunton, to Paddy (*née* Symmers), wife of Dr. Charles Barton, M.B., a daughter—Jane. A sister for Moyna and Ruth.

COLE.—On Oct. 11, 1947, at Trieste, to Kathleen (*née* Collins), wife of Major P. L. G. Cole, R.A.M.C., a daughter—Jane Ingrid Peirson.

DICKSON.—On Oct. 17, 1947, at Ardencaple Nursing Home, Nunthorpe, Middlesbrough, to Betty, wife of David C. Dickson, F.R.C.S.(Edin.), Upsall Grange, Nunthorpe, a son.

HAIR.—On Oct. 2, 1947, to Doreen (*née* Bennett), wife of John A. G. Hair, M.B., B.S., D.M.R.E., White Cottage, Camborne, a son.

HALSTEAD.—On Oct. 16, 1947, at Bradford, to Margaret and John Halstead, a son.

PURCE.—On Oct. 10, 1947, at the Haywood Hospital, Burslem, to Eleanor (*née* Frankel), wife of Dr. James Purce, of The Lodge, Basford, Stoke-on-Trent, a daughter.

REWELL.—On Oct. 4, 1947, at Nuffield House, Guy's Hospital, to Betty Jean (*née* Willis) and Dr. R. E. Rewell, a daughter—Susan Jane.

WILLATT.—On Oct. 14, 1947, at Bognor Regis, to Dr. Ruth (*née* Evershed), wife of Dr. I. D. Willatt, a son.

DEATHS

AYLEN.—On Oct. 12, 1947, at Angmering-on-Sea, Ernest Vaughan Aylen, D.S.O., M.R.C.S., L.R.C.P. (Lieutenant-Colonel, R.A.M.C., Ret.), aged 70.

BEATTY.—On Oct. 16, 1947, at 49, Stafford Road, Weston-super-Mare, James Beatty, M.D., M.R.C.P.

BROWN.—On Oct. 2, 1947, at Lubwa, Chinsali, N. Rhodesia, Rev. David M. Brown, M.D.

DOBSON.—On Oct. 2, 1947, at 75, Liscard Road, Wallasey, Cheshire, Robert Thornley Dobson, M.B., Ch.B.

DODDS.—On Oct. 15, 1947, at Strathaird, Easter Belmont Road, Edinburgh, Mary Janet Dodds, O.B.E., L.R.C.P.&S.Ed.

HOUGHTON.—On Oct. 11, 1947, at Eastbourne, Murtaugh James Houghton, M.R.C.S., L.R.C.P.

KIRK.—On Oct. 9, 1947, at 167, Coniscliffe Road, Darlington, Charles Joseph Kirk, M.B., Ch.B.

LAND.—On Oct. 11, 1947, John Murgatroyd Land, M.R.C.S., L.R.C.P., of 29, St. Andrew's Villas, Bradford, aged 59.

MACGILLIVRAY OF MACGILLIVRAY.—On Oct. 15, 1947, at Crail, Fife, Angus, MacGillivray of MacGillivray, T.D., C.M., M.D., D.Sc., LL.D.

PEARSON.—Harry Linden Pearson, M.B., Ch.B., of St. Anne's-on-Sea.

PICKERING-PICK.—On Oct. 14, 1947, at Combe Lodge, Chambercombe Park, Ilfracombe, Lawrence Pickering-Pick, M.R.C.S., L.R.C.P.

QUINE.—On Sept. 22, 1947, Albert Edward Quine, F.R.C.S., of Whitstable.

RAWES.—On Oct. 8, 1947, at his home, Charles Kinsman Rawes, M.B., Ch.B., aged 81.

SHARPLES.—On Oct. 11, 1947, at Buxton Cottage, Buxton Lane, Caterham, Surrey, Moses William Sharples, M.B., C.M., aged 78.

SMITH.—On Oct. 13, 1947, at Woking, Surrey, Gilbert Johnston Smith, M.B., Ch.B. (I.M.S., Ret.), aged 49.

WARREN.—On Oct. 11, 1947, Herbert Henry Warren, M.B., Ch.B., of 24, Goldsmith Avenue, Southsea.

WESTON.—On Oct. 11, 1947, William Gordon Weston, M.B., Ch.B., of 37, Stanhope Gardens, London, S.W., aged 67.

WHITE.—On Oct. 11, 1947, at the County Hospital, Ashton-under-Lyne, Leonard White, M.R.C.S., L.R.C.P.

EPIDEMIOLOGICAL NOTES

Poliomyelitis

The decline in the notifications of poliomyelitis 338 (402) and of polio-encephalitis 26 (27) continued in the week ending Oct. 11. Figures for the previous week are shown in parentheses. In London Administrative County notifications were: poliomyelitis 31 (38), polio-encephalitis 3 (3).

There were substantial declines in the notifications of poliomyelitis in Bedfordshire 3 (10), Durham 5 (14), Essex 7 (24), Lancashire 43 (64), Middlesex 17 (28), and Yorkshire West Riding 11 (18); the most important rise was in Derbyshire 13 (5).

Two large-scale inquiries are known to be in progress: one from the Ministry of Health derives its information from certain general and infectious diseases hospitals throughout the country and aims at securing more accurate estimates of the fatality and severity of the disease in the present epidemic; the other, organized by Dr. A. M. McFarlan and other members of the staff of the Public Health Laboratory Service, will be more comprehensive and is concerned with the epidemiology of the disease in selected areas. Although these two inquiries are

separate and should not be confused it will be found that so far as hospitals are concerned the method of tabulation of cases is almost the same for both.

Cholera in Egypt

Deaths from cholera in the present epidemic in Egypt now number well over 3,000. For the first three weeks of the epidemic the figures given officially each day listed deaths, positive cases, and suspected cases; an abrupt rise in incidence was noted a fortnight ago, when the figures were:

	Deaths	Positive Cases	Suspected Cases
Oct. 10	68	141	170
„ 11	69	180	132
„ 12	112	216	150
„ 13	114	238	114
„ 14	123	358	

Since Oct. 14 "suspected" cases have not been recorded, and the deaths on the four subsequent days were 175, 308, 247, and 279, with between 600 and 700 positive cases each day. On Oct. 20 there were 561 deaths, and 1,022 new cases were notified.

These figures are probably minimal. Nokrashy Pasha, the Prime Minister, has stated that the authorities are being hampered by the failure to report cases. It appears that Alexandria is still free from infection. Cairo has relatively few cases, and the provinces most affected are Sharkia and Dakahlia.

According to the *Egyptian Mail*, credits allotted to the anti-cholera campaign now total £E.1,000,000. The Royal Egyptian Air Force is continuing D.D.T. spraying of certain overcrowded districts in Cairo, and more than 12,000 houses have been individually sprayed with D.D.T. in kerosene. Movement across the Nile has been restricted; railway travel is curtailed, and arrangements are in hand to increase the number of persons inoculated daily to 500,000.

Cholera and Dysentery in Punjab

In the week ending Oct. 14, according to recent Press reports, 593 people died from cholera and dysentery in East Punjab, as compared with 663 in the preceding week. This is said to correspond to a fatality rate of some 25%.

Discussion of Table

In *England and Wales* an increase occurred in the notifications of scarlet fever 206, measles 117, acute pneumonia 73, diphtheria 34, cerebrospinal fever 16, and dysentery 10, while decreases were reported in the incidence of acute poliomyelitis 39, whooping-cough 19, and typhoid fever 10.

A small increase in the incidence of scarlet fever was recorded in most areas; the largest rise was Lancashire 78. The notifications of this disease were two and a half times the number recorded five weeks ago.

There was a slight general rise in the notifications of diphtheria; the largest increase was in Durham, where the number of cases rose from 7 to 20. There were no large changes in the local returns of whooping-cough. A small rise in the notifications of measles was recorded in most areas; the largest rise was Lincolnshire 45.

Of the 12 cases of typhoid 8 were notified in Middlesex, Harrow U.D., where 6 cases appeared in the preceding week. An outbreak of dysentery involving 14 persons was recorded in Durham, South Shields C.B. The only other large returns of dysentery were Lancashire 17 and Surrey 10.

In *Scotland* an increase in incidence was reported for measles 43, scarlet fever 34, and diphtheria 18; a decrease was recorded for poliomyelitis 15. The increase in cases of diphtheria was contributed by Glasgow with a rise from 15 to 29. A general rise in the incidence of scarlet fever occurred throughout the Western area. There were no notable fluctuations in the trend of poliomyelitis.

In *Eire* the chief feature of the returns was an increase of 23 in the notifications of scarlet fever. Notifications of diarrhoea and enteritis remained at the level of the preceding week, while the incidence of measles increased by 13 and the number of cases of diphtheria fell by 7.

In *Northern Ireland* 14 cases of poliomyelitis were notified, compared with 1 in the preceding week. The notifications of scarlet fever increased by 10.

Week Ending October 11

The notifications of infectious diseases in England and Wales during the week included: scarlet fever 1,316, whooping-cough 1,043, diphtheria 201, measles 1,639, acute pneumonia 403, cerebrospinal fever 45, acute poliomyelitis 338, acute polioencephalitis 26, dysentery 67, paratyphoid 12, and typhoid 8.

No. 40

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended Oct. 4.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1947 (a)	(b)	(c)	(d)	(e)	1946 (Corresponding Week) (a)	(b)	(c)	(d)	(e)
Cerebrospinal fever	46	1	15	5	3	32	2	10	2	—
Deaths		—	—				—	—		
Diphtheria	218	25	55	12	1	319	22	105	44	10
Deaths	4	—	1	1	—	5	—	—	2	—
Dysentery	97	8	20	—	1	63	5	35	1	—
Deaths				—	—				—	—
Encephalitis, lethargica, acute	1	—	—	—	—	2	—	—	—	—
Deaths		—					—			
Erysipelas			37	6	7			39	7	3
Deaths		—					—			
Infective enteritis or diarrhoea under 2 years				84					58	
Deaths	85	7	19	9	2	39	3	8	16	1
Measles*	1,256	32	99	130	5	1,781	91	117	52	8
Deaths	1	—	—	—	—	2	—	—	—	—
Ophthalmia neonatorum	46	4	7	—	—	80	8	11	—	—
Deaths										
Paratyphoid fever	16	2	4 (B)	—	—	20	—	2 (B)	—	1 (B)
Deaths	—	—	—	—	—	2	—	—	—	—
Pneumonia, influenzal	330	13	2	3	2	411	21	2	—	1
Deaths (from influenza)†	5	1	—	—	1	7	1	1	—	—
Pneumonia, primary			135	7				165	16	
Deaths		18		8	10		21		5	7
Polio-encephalitis, acute	27	3				2	—			
Deaths		1					—			
Poliomyelitis, acute	402	38	95	9	14	23	—	1	4	1
Deaths		—					—			
Puerperal fever		2	8		—		2	18		—
Deaths										
Puerperal pyrexia‡	134	11	14	—	2	163	9	20	4	—
Deaths		—					1			
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,086	85	215	56	42	1,079	91	218	36	32
Deaths	1	—	—	—	—	—	—	—	—	—
Smallpox	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Typhoid fever	12	—	3	3	2	11	3	2	6	3
Deaths	3	1	—	—	—	—	—	1	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths				—	—				—	—
Whooping-cough*	1,086	116	33	42	4	1,311	90	96	31	22
Deaths	9	3	1	3	—	12	3	1	—	—
Deaths (0–1 year)	392	49	57	32	8	385	58	55	32	9
Infant mortality rate (per 1,000 live births)										
Deaths (excluding stillbirths)	4,207	597	567	140	96	3,914	604	538	188	103
Annual death rate (per 1,000 persons living)			11·8	8·8				11·8	12·0	
Live births	8,995	1329	1044	521	252	9,570	1482	1114	431	295
Annual rate per 1,000 persons living			21·0	32·9				22·4	27·6	
Stillbirths	204	30	42			253	33	33		
Rate per 1,000 total births (including stillborn)			39					29		

* Measles and whooping-cough are not notifiable in Scotland, and the returns are therefore an approximation only.

† Includes primary form for England and Wales, London (administrative county), and Northern Ireland.

‡ Includes puerperal fever for England and Wales and Eire.

Any Questions?

Correspondents should give their names and addresses (not for publication) and include all relevant details in their questions, which should be typed. We publish here a selection of those questions and answers which seem to be of general interest.

Expression of Placenta

Q.—*At the Rotunda Bicentenary Congress it was urged that Credé's manœuvre for expressing the placenta should be abandoned. What procedure is now advocated when the placenta is still in utero thirty minutes after delivery, or when there is bleeding due to partial separation of the placenta? And, further, do obstetricians condemn squeezing the uterus to empty blood-clot where there is a steady loss of blood after expulsion of the placenta and the uterus is well contracted?*

A.—The abandonment of Credé's manœuvre has long been advocated by some authorities, and statements to this effect, couched in no uncertain terms, are to be found in standard works on midwifery, such as *Principles and Practice of Obstetrics*, by J. B. DeLee and J. P. Greenhill, 1947. All are agreed that the squeezing of the uterus which is involved is conducive to shock, and some will say that it rarely achieves its object—separation of the placenta from the uterine wall. The obvious alternative to Credé's manœuvre is to remove the placenta manually. Whether in the absence of bleeding it is justifiable to do this at the end of half an hour is open to question, but it should certainly be seriously considered at the end of one hour, and at any time before then if the patient's pulse rate begins to rise or she shows signs of impending shock. An alternative when there is no emergency is possibly to inject the cord with saline, although this appears to be effective in only a few cases. If, when the placenta is still partly adherent, haemorrhage occurs, immediate action must be taken, and the alternatives are either to remove the placenta manually or to give an intravenous injection of ergometrine or an intrauterine injection of oxytocin. This was discussed at some length in a reply to a question which appeared in the *Journal* of Aug. 2 (p. 195) and in a letter from Prof. Chassar Moir (Aug. 23, p. 309). The latter pointed out that the intravenous dose of ergometrine should never exceed 0.25 mg. The writer, however, has worked in a hospital where 0.5 mg., and even 1 mg., of ergometrine has been given intravenously almost as a routine by the medical staff for nearly two years, and no member of the medical or nursing staff has ever seen any reaction or ill effect attributable to the drug. It must be admitted, however, that many patients were partly or wholly under the influence of an anaesthetic at the time and so were incapable of recording their sensations. Whether such a large dose is really necessary is debatable, but in emergency it can certainly be given with safety. There is still some difference of opinion as to whether manual removal is preferable to an oxytocic drug, but if the surroundings are unfavourable there is much to be said for the latter. Gentle and cautious squeezing of blood-clot from the uterus would probably not be condemned by most authorities; the amount of force required is much less than in the case of an adherent placenta. Blood-clots, however, cause bleeding by interfering with retraction and contraction of the uterus, and if the uterus is firmly contracted any clot which is expressed comes from the cervix and vagina—where it is doing no harm. When the uterus is relaxing and blood is collecting within, the administration of an oxytocic drug by the intravenous or intrauterine route should be just as efficient as manual squeezing, and possibly more so.

Marital Phthisis

Q.—*Is there any evidence to suggest that there is a higher incidence of pulmonary tuberculosis among the consorts of sputum-positive cases of tuberculosis than in the corresponding age and sex groups of the population at large? What literature on this subject can you recommend?*

A.—So many conflicting reports have been published on this subject that it is impossible to be dogmatic. Fishberg, after quoting many references from the previous literature together with some of his own figures, concludes that the incidence of marital phthisis is about 3%—amazingly small when the intimacy of contact is considered. On the other hand, Opie and McPhedran, in a study of 133 married couples, found that 20% of the consorts of sputum-positive individuals developed clinically manifest disease. On the whole the evidence shows that the incidence of pulmonary tuberculosis is higher in the consorts of tuberculous individuals than in those of the non-tuberculous. But it is only slightly higher, and there is much evidence to show that prolonged exposure is necessary to produce infection and that the infection which develops tends to be of a benign type. For further references to the literature on this subject consult Fishberg, M., *Pulmonary Tuberculosis*, Kimpton, London, 1932; Opie, E. L., and McPhedran, F. M., *Arch. intern. Med.*, 1932, **50**, 945; and Rich, A. R., *The Pathogenesis of Pulmonary Tuberculosis*, Thomas, Springfield, Illinois, 1946.

Polyuria

Q.—*What are the probable causes of polyuria in a male, aged 66, with no glycosuria and no physical signs of enlarged prostate, stone, or nephritis? The patient is fairly healthy, but has symptoms of an apparently over-active vagus, with dizziness after rapid change of posture or on climbing stairs. These symptoms have persisted for some years. Blood pressure 140/92 mm., urine normal (except for the quantity and consequent frequency), and haemoglobin 92%. Is it usual for a vagus disturbance to be repeated in the great splanchnic nerve, and, if so, how is the increased production of urine mechanically brought about? Are there any known causes for an unusual vagus activity?*

A.—It is essential to obtain precise measurements of the daily urinary volume when patients claim to be passing a greater quantity than normal. In most instances their claims are ill founded, and increased frequency of micturition alone is present. If there is a true increase in urinary volume, the quantity of fluid drunk during the day should be measured: some patients acquire habits of drinking amounts of water in excess of their needs. With the exceptions of diabetes mellitus and diabetes insipidus, all other causes of polyuria depend upon impaired kidneys being unable to elaborate a normally concentrated urine. Diabetes insipidus is improbable in a man of 66, particularly as the condition seems to have been static for several years. If he can pass urine with a specific gravity above 1020, significant renal disease is unlikely. In diabetes insipidus a normal specific gravity can be achieved after injection of "pitressin." Investigation along these lines would be required before the question could be answered more exactly.

The cardiovascular symptoms noted are common in those past middle age with some arterial degeneration; they depend upon the diminished readiness with which arterial pressure adjusts itself to postural changes. It is doubtful whether vagus activity plays much part.

Swabbing Maternity Ward Attendants

Q.—*What are the generally accepted rules for the swabbing of throats of the attendants of a maternity ward? How often should it be done, and should both nose and throat be swabbed? In addition to Str. pyogenes Group A, are any other of the haemolytic streptococci pathogenic? Are any of the staphylococci regarded as pathogenic, especially with regard to pemphigus of the newborn? In the case of a nurse carrying pathogenic streptococci in her throat, how many negative swabs should be asked for, and over what period, before she can work in a maternity ward?*

A.—Practice varies considerably, and there has been a tendency to relax such precautions since chemotherapy has so greatly lessened the dangers of puerperal fever. Strict control demands swabbing of all personnel before employment, at regular intervals thereafter (every two or three months), and following any upper respiratory tract infection. Nasal swabs as well as throat swabs are necessary; the nasal carrier is much the more dangerous. Although puerperal fever, and even septicaemia, are occasionally due to streptococci of other Lancefield groups than A, it is usual to disregard carriers of any but Group A, since this causes the great majority of serious cases of puerperal fever and is almost always concerned when

the disease occurs in epidemic form. The significance of a negative finding in a swab from a previous streptococcus carrier varies with the degree of skill with which the swab is taken and examined, and with the nature of the carrier state—whether symptomless or accompanied by catarrh or tonsillar hypertrophy. In the absence of any visible lesion a single competent negative swab should suffice.

Staphylococcus pyogenes aureus (recognized as pathogenic by the coagulase test) is the cause of pemphigus in infants, and multiple nasal carriers among maternity home staffs are its usual source. This subject was exhaustively dealt with in the *Journal* recently (see article by V. D. Allison and Betty C. Hobbs, July 5, p. 1).

Over-possessive Women

Q.—*Is there any recognized psychosis or neurosis which corresponds to the ancient idea of "possession by evil spirits"? Having lately come across more than one pathologically possessive woman, I am tempted to formulate the following generalization: "A possessive woman is a woman possessed." In extreme forms the condition would seem fraught with potential evil both to the patient and to those about her.*

A.—Under "possession by evil spirits" the ancients must have understood a number of different syndromes, which certainly included epilepsy and hysteria, and probably others such as schizophrenia, mania, and melancholia. No modern concept exactly corresponds. It is true that the over-possessive woman can wreak havoc with the lives of others, especially husband and children. She is nearly always enabled to do so by meeting inadequate resistance from those who are "possessed." Her victims are commonly persuaded of the justice of her claims, but much may often be done by the trusted medical adviser to induce a healthier and more realistic attitude. He is in a particularly favourable position to do so if, as is often the case, she maintains her claims by representing herself as an invalid. It is rare that the "disease" is one of a single person; more usually it is a disordered relationship between two or several persons. Despite the malignant effects of such disorders, a psychotherapeutic attack is often possible.

Chronic Prostatic Infection

Q.—*While in the Forces a male aged 24 years contracted a Bacterium coli urinary infection, starting with orchitis. No history of V.D. or risk. He has spent months in hospital, and has now been discharged as incurable on sulphathiazole 0.5 g. thrice daily. He has been told that the infection is in the prostate and surgical removal might be the only cure. Shortly after stopping the drug the urine becomes foul and the patient feels ill. Can he with impunity continue to take the recommended dose of sulphathiazole indefinitely, and what alternative treatment do you suggest?*

A.—It is a little pessimistic to regard a persistent infection of the prostate as being incurable. There are a few cases only which require surgical treatment in the way of perineal drainage for an abscess cavity in the parenchyma of the prostate. The great majority of such cases finally clear up with prolonged courses of prostatic massage, posterior irrigation, and the use of the sulphonamides. Sulphathiazole should not, of course, be continued indefinitely, but in separate courses of treatment resumed at intervals.

Vaccination of a Nursing Mother

Q.—*If a nursing mother is vaccinated, what effects may this have on the child? Recently I vaccinated a mother, and within a week the baby had thirty or forty papules not unlike those of chicken-pox on its body. The mother blamed the vaccination.*

A.—It is probable that following the development of immunity as a result of vaccination of the mother there will be some passive transfer of antibody to the infant. It would be possible for a vaccinated mother to infect her child with vaccinia as soon as a lesion appeared at the site of vaccination. The diagnosis of vaccinia in the child (or any vaccinated subject) can be readily confirmed in a virus laboratory by inoculation of material on to the chorio-allantoic membrane of the developing chick embryo.

Sterilization of Syringes and Specula

Q.—*Is it possible to sterilize a spinal needle satisfactorily without an autoclave? What is the best solution for sterilization by prolonged immersion of syringes and specula for ordinary surgery use? I find that liq. borac. et formaldehyde (N.W.F.) ruins the hands if it touches them; and 5% liq. chloroxylenol. in surgical spirit forms a most adherent and obstinate precipitate.*

A.—The best method is to place in a dry oven at 150° C. for 1 hour. A less satisfactory alternative, but far better than the use of chemicals and subsequent rinsing in water, is boiling. A Record syringe cannot be sterilized chemically (for authority for this statement and general instructions on the subject see "The Sterilization, Use, and Care of Syringes," Medical Research Council War Memorandum No. 15, H.M.S.O., 4d.). A speculum should not be so difficult to sterilize, and could be freed of ordinary bacteria by any efficient disinfectant solution, including either of those mentioned, 2% lysol, or spirit. Disinfectants should not be condemned for such a purpose because they affect the skin; articles should be removed from them with forceps. Needless to say, for the patient's sake they need rinsing before use, and all such methods, properly carried out, are really more troublesome than boiling.

NOTES AND COMMENTS

Short-stay Hostel for the Aged and Infirm.—The old and infirm are often nursed at home by their own relatives. Old people who are becoming "difficult" may be more exacting in their demands on relatives than they would be to strangers or nurses. A recent and helpful development in connexion with this recurrent problem is the provision by the Red Cross of a hostel where elderly men and women, ambulant or bedridden, can stay for a fortnight or more, while their relatives have a rest or a holiday. Their own general practitioners can visit them as often as they wish, and their own callers may come on any afternoon, and on two evenings a week. The house, a gift to the Red Cross, is of moderate size, with a fairly large garden, a lawn, and some fine trees. There are pleasant rooms, airy and sunny, with wards on the ground floor containing six beds apiece, and a comfortably furnished sitting-room with a wireless.

A fully qualified sister is in charge, with four helpers for day duty, and at night there are three on the premises, of whom one is a qualified nurse. In this hostel none of the staff lives in, but this is not a feature which need necessarily be copied elsewhere. At the same time it should be realized that many types of hospital, hostel, and institution are finding that the employment of non-resident staff is the only answer to the problem of recruitment. The running cost of this hostel varies from time to time, but it has usually worked out at rather more than £4 per head a week, a moderate amount compared to the maintenance cost of hospitals. Visitors usually pay £3 10s. a week, and the balance is found by the Red Cross. Schemes of this kind are obviously deserving of support, and it may be that every county should set up some similar scheme.

Correction.—Owing to a printer's error the name of Mr. Keith Vartan was unfortunately misspelt in the review of *The 1946 Year Book of Obstetrics and Gynaecology* in the *Journal* of Oct. 18 (p. 615).

INCOME TAX

All inquiries will receive an authoritative reply but only a selection can be published.

Retirement—Subsequent Receipts

A. D. asks whether he is liable for income tax on money earned before but collected after retirement.

*** A. D. has presumably been assessed in past years on the "cash receipt" basis. If, as is usually the case, such receipts have been year by year a fair index of the gross value of the bookings—and assuming that this is true of the last year before retirement—no tax is due in respect of post-retirement receipts.

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